Benefit-Sharing Mechanisms in Renewable Energy

Final Report

Tender No. TREN/D1/469-2009

January 2011

Rebel Group Advisory bv
Wijnhaven 3-o
3011 WG Rotterdam

www.rebelgroup.com

Jan Coen van Elburg (Project Leader)

jancoen.vanelburg@rebelgroup.com

Renaat Jansen

renaat.jansen@rebelgroup.com

Elisabeth Schuurmans

elisabeth.schuurmans@rebelgroup.com

COWI A/S
Prallelvej 2
DK – 2800 Kongens
Lyngby

www.cowi.com

Anders Richelsen

ARI@cowi.dk

Istituto di Studi per l'Integrazione dei Sistemi
Via Flaminia 21
00196 Rome – Italy

www.isis-it.com

Michela Fioretto

mfioretto@isis-it.com

Supported by The Dutch Research Institute For Transitions (DRIFT), www.eur.nl/fsw/drift/

Study conducted for:

References: Rebelgroup, " Benefit Sharing Mechanisms for Renewable Energy Sources" (RESHARE), final report 2011
Contacts: jancoen.vanelburg@rebelgroup.com

Table of Contents

Foreword

When planning for a project which will harvest a Renewable Energy Source, there are Legal, technological and financial aspects which need to be dealt with. A bottleneck that is particularly hard to tackle is the issue of acceptance. RES projects may affect local communities, and therefore invoke a reaction, one which is usually against the project in that specific location. The REShare project offers solutions through the sharing of information on how to use Benefit Sharing Mechanisms as an effective tool to create a basis for acceptance.

List of Abbreviations

BSM – Benefit Sharing Mechanism

REP – Renewable Energy Project

RES – Renewable Energy Source

1. Introduction

1.1 The Challenge in a Nutshell

Reducing CO2 emissions Stimulating renewable energy, as a clean source of energy, has been identified by governments all over the world to be a policy priority, as illustrated by initiatives such as the '20-20-20' goals of the EU or 'the Covenant of Mayors commitment to local sustainable energy'[1]. The success in stimulating renewable projects has been considerable: globally the investment grew by 4,7% between 2007 and 2008 to a total amount of 110 billion euro[2] and approximately 2,3million people were employed by the industry[3].

Although the use of renewable energy sources (RES) is broadly supported, the huge growth of renewable projects is leading to increasing acceptance issues at a community level. The acceptance issues are diverse: Concerns for local fauna and flora, noise, landscape pollution, a feeling of identity loss stemming from rural surroundings etc… Local resistance poses problems to project developers who face delays, litigation, increased costs and damage to their image. Local acceptance is also an important issue for governments with ambitious policy goals for renewables. In particular politicians at a local level face public pressure from their electorate when considering a new project in their community.

Social resistance raises the question of who ultimately receives the benefits of renewable energy. Citizens in various countries raised the issue of accepting new developments while the benefits of the development are enjoyed by others. Both developers and local governments have begun to reconsider their pathway towards sustainable energy: Sustainable for whom?

The policy challenge for local governments is to further stimulate and enable the development of RES projects in their regions, in agreement with the national agenda, without compromising local social cohesion. Developers on the other hand are faced with the challenge of tackling social resistance without diminishing the profitability nor the legitimacy of their projects. An effective framework for SHARING of RESources is necessary.

[1] http://regions202020.eu

[2] Clean Edge (2009). Clean Energy Trends 2009 pp. 1-4.

[3] Jobs in Renewables Ewpanding – World Watch

Box 1: More siting issues?

Achieving the renewable policy objectives implies that energy production will become more visible for all citizens. RES projects typically have a much larger visual impact per MW capacity. For example: the largest on-shore wind farm in the Netherlands (Koepel Windenergie NOP) will have a nameplate capacity of 430MW, comparable to a gas / coal plant or a small nuclear reactor, but consists of approximately 100 wind turbines. The large PV project, Solar Park Rothenburg, has a nameplate capacity of 20,6 MW but requires 68ha of land. As most RES projects are smaller than the examples above, a large number siting decision will have to be made to increase the share of Renewables as amongst others illustrated by the Reshare animation published on You Tube (search for Reshare EU).

An additional issue which complicates the siting of new RES projects is the lack of flexibility in the site selection: The presence of the renewable resource determines the location. While most fossil fuel facilities are built in industrial areas, the most favourable sites for renewables are in remote or rural areas, where local stakeholders are unaccustomed with such developments. This significantly increases resistance.

1.2 The Role of Political Support & Communication

Communication plays an essential role in realising these ambitions. Poor communication has often led to a rather ambiguous message as the renewables policy seems expendable when needed. This has had its impact on the community level. Dedication to the policy agenda and specifically its consequences (i.e. more siting decisions, visibility of energy production) needs to be communicated in an honest and straightforward manner. When the legitimacy of the project cannot be contested, RES developers can focus on the individual challenges the project poses.

The cases examined by the RESHAE study also highlight the importance of local political support and an open channel of communication between the developer and the community. Successful projects demonstrate that involving the community from the initial planning phase of a project and agreeing on certain principles for the implementation of the project often reduces resistance. Local authorities who support the project are able to act as a trusted mediator between the local community and the developer. This is only possible when the legitimacy of the project cannot be challenged.

1.3 Performance Indicators

Renewable energy projects face four main challenges depicted in figure 1. This project focuses on acceptance issues although the various challenges are mutually influencing.

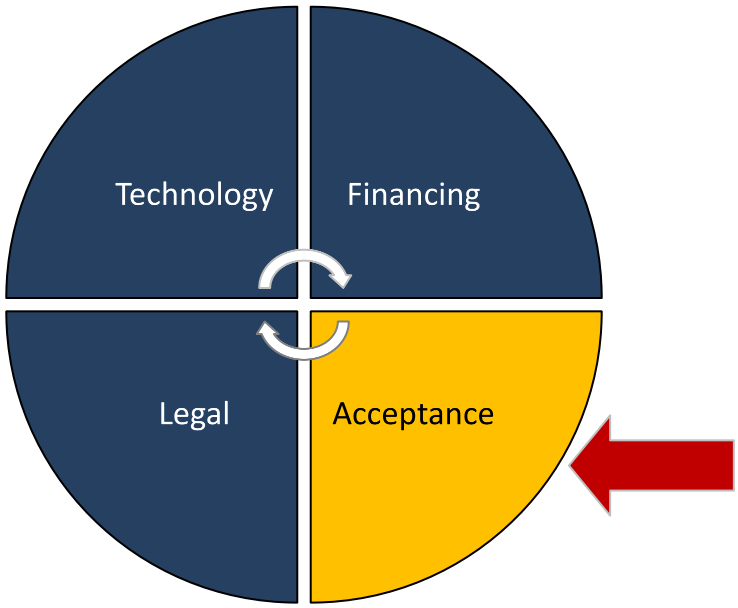


Figure 1: Challenges for Renewable Energy

in general there is a widespread support for renewable energy amongst the general public. The contrast between this support and the resistance of local communities against new developments defines the paradoxical nature of the social acceptance challenge. Various arguments are used for resisting new RES projects: Loss of environmental quality and amenities (such as noise, visual intrusion) are common motivations for resisting hydroelectric and wind energy systems whereas erosion and/or misuse of arable land are common reasons for resisting wind, solar and biomass energy plants. Social acceptance on a local level is crucial in increasing the share of renewables in the energy mix , but complementary to the financial (fiscal stimulation/ support mechanisms...) and legal (licensing procedures, lack of standards ...) conditions. This project focuses on mechanisms which may aid project developers in tackling social resistance at a local level, but benefit sharing can also have a positive impact on legal, financial and technological aspects.

From existing literature and empirical analysis of renewable energy cases we have identified the following obstacles for social acceptance:

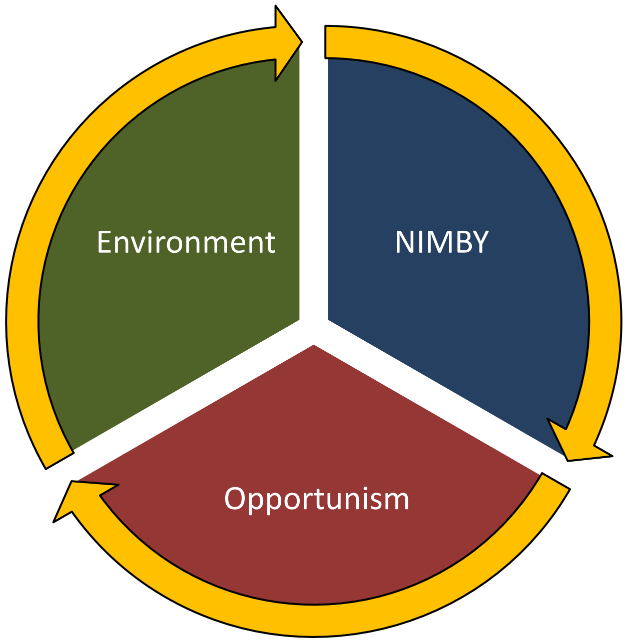


Figure 2: Acceptance Issues

These 'challenges' are used as performance indicators for the different mechanisms in dealing with the local social resistance against energy projects:

Environment: Environmental resistance stems from fears that the project will harm the local environment and residents. Threatening local fauna and flora, pollution of a pristine area (e.g. damming a river, placing electricity lines through forests ...), noise and health effects are all examples of environmental reasons for resisting a new development.

- Example: in the case of Bouin in France, LPO, a bird protection agency, filed a lawsuit against the developers. As the wind farm is sited nearby a lake where several rare birds nest, the agency feared the turbines would harm the local birds.

NIMBY: 'Not in my backyard' has been used in the past as a 'catch-all' category for resistance. In this study it refers to a very personal type of resistance motivated by the preservation of one's surroundings, compensation for (economic) loss and a desire to return to situation before the new development[4]. NIMBY-ism is in other words motivated by personal feelings rather than a greater goal such as the environment. Fears that the project poses a threat to local tourism, devaluates property values, causes

[4] Kahn, R. (2000). Siting Struggles: The Unique Challenge of Permitting Renewable Energy Power Plants. The Electricity Journal , 21-33.

visual pollution or causes a “loss of identity” by changing the rural surroundings are examples of NIMBY-ism.

- Example : in the case of the EDP Hydro project in Fridão the community of Amarante opposes the construction of a downstream dam as the water level in the Tâmega river would rise in the city. They fear that higher water levels would reduce the river’s banks, affecting the look of the city and removing the ability to enjoy walks along the river, instead replacing this type of recreation by more polluting and noisy forms such as jet-skis.

Opportunism: Opportunistic resistance to a project is largely motivated by extracting the highest possible additional benefit (outside of the original scope of the project) or personal side benefit from a development. This type of resistance is difficult to identify directly as opportunism often presents itself as an environmental or NIMBY issue. Unlike the other motivation for resistance however, opportunistic resistance does not wish the project to fail.

Box 2: A brief note regarding the categories of acceptance issues

The motives for resistance mentioned above cover all the acceptance issues we encountered in the case studies. It is however important to mention that clearly identified acceptance issue is not always present within a project’s framework. Additionally, benefit sharing can be used for other purposes such as for financing the project or to strengthen the business case without tackling any specific resistance (e.g. within certain solar projects).

NIMBY is a particularly relevant for renewables. Renewable energy is relatively new and building its position within the energy mix (i.e. still requires several siting decisions) at a moment in time when the NIMBY syndrome is widespread. Although siting new grey facilities is probably even more difficult at the moment due to the high HSSE (Health, Safety, Security and Environment) impact and climate impact, most fossil-fuelled and nuclear plants were built between 1960 – 1980. From discussions with developers also active in the field of fossil-fuels it is clear that NIMBY-syndrome was less of an issue at the time and expectations for benefit-sharing or compensation were practically non-existent.

2. Analysis

2.1 Impact evaluation methodology

The methodology used for the purpose of this study combined a review of existing literature and case study analysis. The literature review focussed on lessons learnt from resistance and benefit sharing in other sectors and a review of the existing literature on this topic for renewables. The results of this literature review have been published on the project website (www.reshare.nu) and is attached in annex 4 of this report. In order to discuss and qualify the preliminary results of the analyses, an expert workshop was organised in June 2010. Furthermore a seminar with a wider group of experts and practitioners was organised in November 2010. The presentations from the seminar are available at the RESHARE website (http://www.reshare.nu/en/reshare/seminar).

Most efforts have, however, been devoted to case study analysis. All case studies are presented in a database at the RESHARE website (http://www.reshare.nu/en/reshare/reshare-database).The case studies focus on the use of benefit sharing mechanisms and are categorised on the basis of their characteristics (technology, energy source, country/region) as well as the availability of data.

After collecting the data from the different cases we performed an analysis using impact tables.[5] The impact tables include the performance criteria in the form of *motivations for resistance to energy projects* (Environment, NIMBY, and opportunism) and the different cases grouped per benefit sharing mechanism. The impact tables demonstrate the impact that every benefit sharing mechanism has on the different issues of resistance (motivations for resistance) as they are captured by the performance criteria with data provided by the different cases. In our evaluation, every case is compared to other cases where the same benefit sharing mechanism is applied.

The empirical data analyzed focused on benefit sharing mechanisms for 23 European cases with different renewable technologies (Table 1). Opportunistic resistance in the cases below remains however difficult, and sometimes even controversial to identify. Opportunistic resistance usually manifests itself indirectly through for example legal blockades (try to slow the permitting process) or masked as either NIMBY or environmental motives. As it is difficult to judge whether the opposition was opportunistic in nature in the cases below, we present this issue in brackets in cases where it seems likely.

[5] In the policy literature this method is also known as "matrix evaluation"

Box 3: A note on opportunism

Interviews with developers demonstrate that opportunistic resistance is increasing, as citizens compare the benefits received between projects. This poses a threat of 'benefit inflation' where certain members of the community will always demand at least the same amount of benefits as were received in other projects, without taking into account the characteristics of the project nor the impact these demands have on the business case.

Based on the available literature and case studies the following benefit sharing mechanisms were identified:

1. **Community Funds:** the local developer provides funds which are at the disposal of the community for common projects or lowering local taxes. These funds are either paid directly into a community fund or collected indirectly through local taxes by the municipality. The use of the funds is managed either by the community or the municipality.
2. **Local (Co-)Ownership:** the developer grants or offers shares in the project to the local community
3. **Compensation:** the developer compensates for possible damages such as ecological damages (e.g. by creating a new habitat for species endangered by the development).
4. **Benefits-in-kind:** the developer creates improvements to the community, usually during the construction phase
5. **Local Employment:** local employment is prioritised the construction phase and/or in the operation phase.
6. **Local Contracting:** Local business are awarded contracts or involved in the development.
7. **Energy Price Reduction for the Local Community:** the local community is granted the opportunity to either consume energy directly from the development at a discount or to purchase energy at lower prices.
8. **Indirect Social Benefits:** any other benefit accruing to the community which is not directly quantifiable such as prestige, eco-tourism, knowledge etc.

Table 1: Overview Cases & Acceptance Issues

Case	Country	Acceptance Issue	BSM applied
Eastgate Renewable Energy Village	UK	No specific issue identified (see Box4)	Benefits-in-kind Local contracting Local employment Indirect social benefits
Svartsengi	Iceland	No specific issue identified (see Box4)	Local employment Energy price reduction Indirect social benefits
Cruach Mhor	UK	Environment	Community fund Compensation Benefits-in-kind Local contracting Local employment
Windkoepel	Netherlands	NIMBY (Opportunism)	Community fund Local ownership/co-ownership

Case	Country	Acceptance Issue	BSM applied
Altahullion Wind Farm	Ireland	No specific issue identified	Community fund Local contracting Local employment Indirect social benefits
Varese Ligure	Italy	NIMBY	Local employment Indirect social benefits
El Hierro	Spain	NIMBY	Co-ownership
Amareleja	Portugal	No specific issue identified	Local employment
Samsø Renewable Energy Island	Denmark	NIMBY	Local ownership/co-ownership Local contracting Local employment
Le Haut-des-Ailes	France	NIMBY (Opportunism)	Community fund Local ownership/co-ownership Compensation Local contracting Local employment Indirect social benefits
Bouin	France	Environment NIMBY (Opportunism)	Community fund Compensation Local employment Indirect social benefits
Evolis	Belgium	NIMBY	Local ownership/co-ownership Benefits-in-kind Indirect social benefits
Småkraft	Norway	No specific issue identified	Local ownership/co-ownership
Texel Energy	Netherlands	NIMBY (Opportunism)	Local ownership/co-ownership Local contracting Local employment Energy price reduction Indirect social benefits
Lake Ostrowo Wind Farm	Poland	Environment (Opportunism)	Community fund Benefits-in-kind Compensation (bird protection studies with radar)
O2	Sweden	NIMBY (Opportunism)	Community fund Co-ownership
Middelgrunden	Denmark	Environment (Opportunism)	Co-ownership
Estinnes	Belgium	Environment NIMBY (Opportunism)	Community fund Compensation Benefits-in-kind Local contracting Local employment Indirect social benefits
EDP Hydro Projects	Portugal	Environment NIMBY	Benefits-in-kind
PV Soundless	Germany	No specific issue identified	Local ownership/co-ownership Benefits-in-kind

Case	Country	Acceptance Issue	BSM applied
Solar Park Rothenburg	Germany	No specific issue identified (see Box4)	Benefits-in-kind Local contracting Local employment Indirect social benefits
Surano Nursery School	Italy	NIMBY	Benefits-in-kind Local contracting Local employment Indirect social benefits
Barba (Lecce) PV power plant	Italy	NIMBY	Benefits-in-kind Local contracting Local employment Indirect social benefits

The table above overview shows that not all RES projects face clearly identified acceptance issues. Still BSM were applied. Either for other purposes (see Box 4) or to prepare for acceptance issues (e.g. in case of extension of project scope/techniques used).

Box 4: Benefit sharing is more than social acceptance.

Benefit sharing is more than simply a mechanism used to tackle social acceptance. In certain projects no acceptance issues were noted but BSMs were included as part of the project philosophy. In the case of Eastgate Renewable Energy Village the renewable energy project replaces an existing industrial site of a closed cement factory. Solar Park Rothenburg complements an existing local airport threatened with closure allowing it to remain open. In other cases benefit sharing is an integral part of the developer's policy for new projects or seen as a manner to increase project scope through additional financing.

2.2 Case study analysis

We used qualitative scores to show the impact that every benefit sharing mechanism has on the community resistance forms. When information is not provided about the impact of the benefit sharing mechanism, then we perceive it as Not Applicable to our knowledge. More specifically, we use the following scale for our impact evaluation:

0 No impact
+ Positive impact on factor
++ High impact on factor
+++ Very high impact on factor
n/a Not Applicable: the resistance factor was not identified for this project => BSM were not used to reduce resistance but for other reasons as for example financing (see box 4)

2.2.1 Community Funds

- Based on the Impact analysis (see Table 2), we observe that community funds may have a positive impact on mitigating resistance due to NIMBY and in lesser ways due to Environment and Opportunism.
- Community funds have been applied in different ways at an operational level. For example in the Case of Bouin (France) and in the Case of Lake Ostrowo (Poland), the community funds were collected in the form of local taxes.

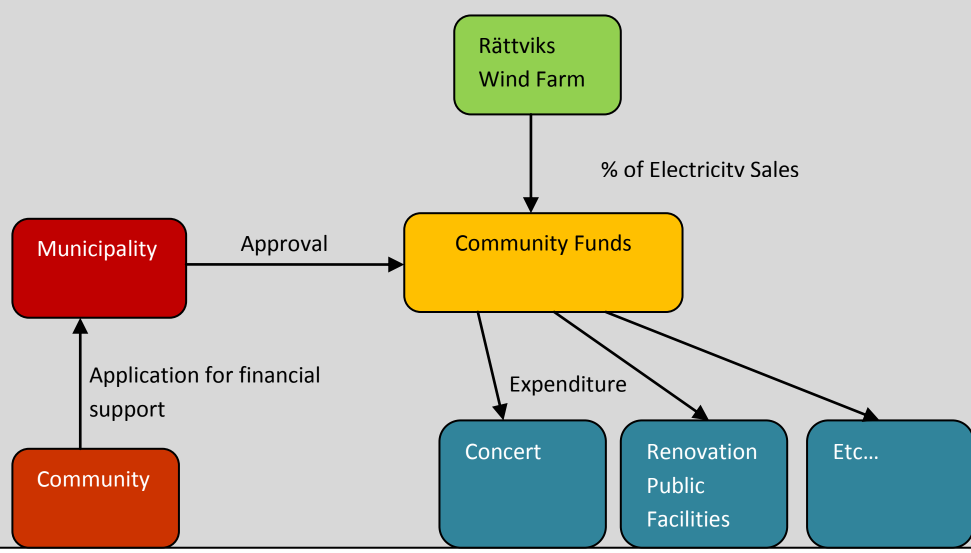
Impact Table of the **Community Funds** Benefit Sharing Mechanism on Community Resistance to energy projects.

	Motives of Community Resistance to Energy Projects		
CASE	**Environment**	**NIMBY**	**Opportunism**
Cruach Mhor	0	n/a	n/a
Koepel Windenergie NOP	n/a	++	+
Altahullion	n/a	n/a	n/a
Le Haut des Ailes	n/a	++	0
Bouin	0	+	0
Lake Ostrowo	+	0	n/a
O2	n/a	+++	+
Estinnes	+	+	0

Table 1: Impact Table Community Funds

Community Funds Example: O2 Business model Rättviks wind farm

O2, a Swedish developer of land based wind-power, maintains a general policy to support the local communities where the wind turbines are erected. The amount of funds is project specific but is always based on the actual production of the wind turbines. The community funds can be administered by the local municipality or a local organisation. The funds may not however be used to finance any of the municipality's ordinary obligations but must be spent on community projects. For the Rättviks wind farm, O2 agreed with the municipality that anyone living in the vicinity can apply for financial support from the community fund for activities and projects which have a positive contribution with a maximum of €10.000 per project.



2.2.2 Local Ownership

- Based on the Impact analysis (see Table 3), we observe that local ownership may have a moderate to high positive impact on mitigating resistance due to NIMBY and low to moderate impact on mitigating resistance due to opportunism.
- The manner in which local ownership is arranged and organised depends on the applicable laws in each country. The type of shareholding or ownership also varies from cooperatives such as in the case of Samsø (Denmark) to shareholding at fixed prices as in Evolis (Belgium) where the share price is fixed at 125Euros and citizens are encouraged to become shareholders.
- We suggest further research on the impact of local ownership on opportunism given that the majority of the cases show a direct influence that requires careful assessment since opportunism can also be masked as NIMBY or environmental issues.

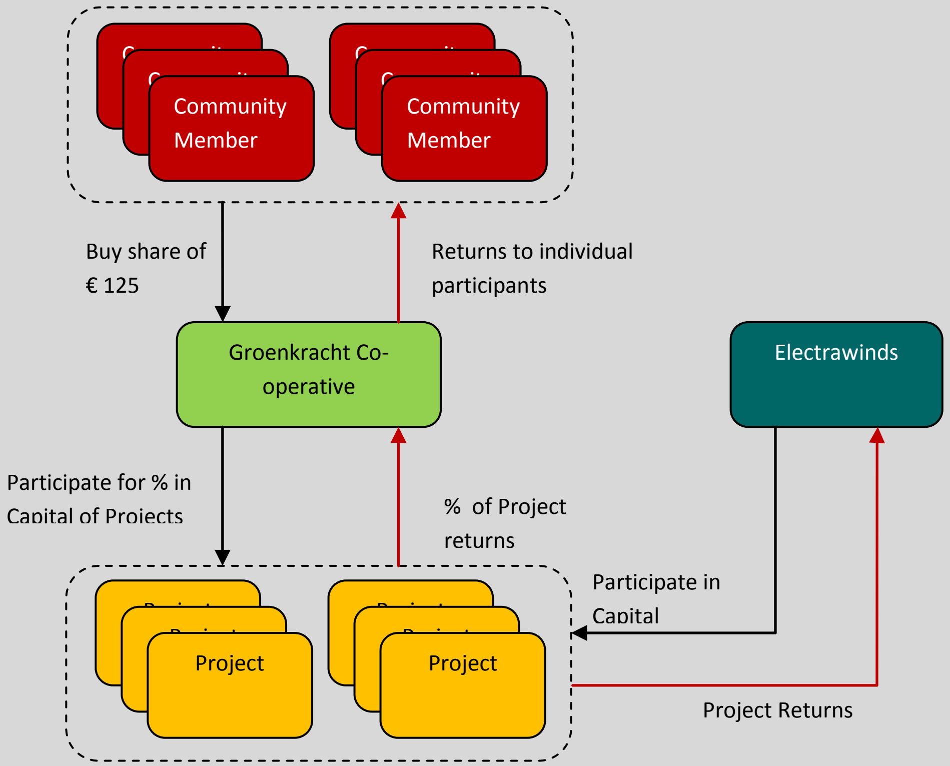
Impact Table of the **Local Ownership** Benefit Sharing Mechanism on Community Resistance to energy cases.			
	Motives of Community Resistance to Energy Projects		
CASE	**Environment**	**NIMBY**	**Opportunism**
Koepel Windenergie NOP	n/a	+	+
Samsø	n/a	++	n/a
Le Haut-des-Ailes	n/a	+++	+
Evolis	n/a	n/a	n/a
Småkraft	n/a	n/a	n/a
Texel Energy	n/a	+++	++
O2	n/a	+++	++
Middelgrunden	n/a	++	+
PV Soundless	n/a	n/a	n/a

Table 2: Impact Table Local Ownership

Co-Ownership Example: Groenkracht Co-operative

Groenkracht, a co-operative investment vehicle from the Belgian Developer Electrawinds, offers community members the opportunity to buy shares and participate in the project being developed in their community.

The co-operative invests however in all new projects of Electrawinds, which severs the 'local connection' between the local community and a specific project. On the other hand this has the advantage that participants in the co-operative invest in a more diversified portfolio of projects and are able to receive returns on their investment earlier. Shares cost €125 each, and citizens are allowed to purchase as many shares as they like. Each participant however only has one vote in the shareholder's meeting, independent of the amount of shares he owns. Participants can expect a return on investment of approximately 6% annually.



2.2.3 Compensation

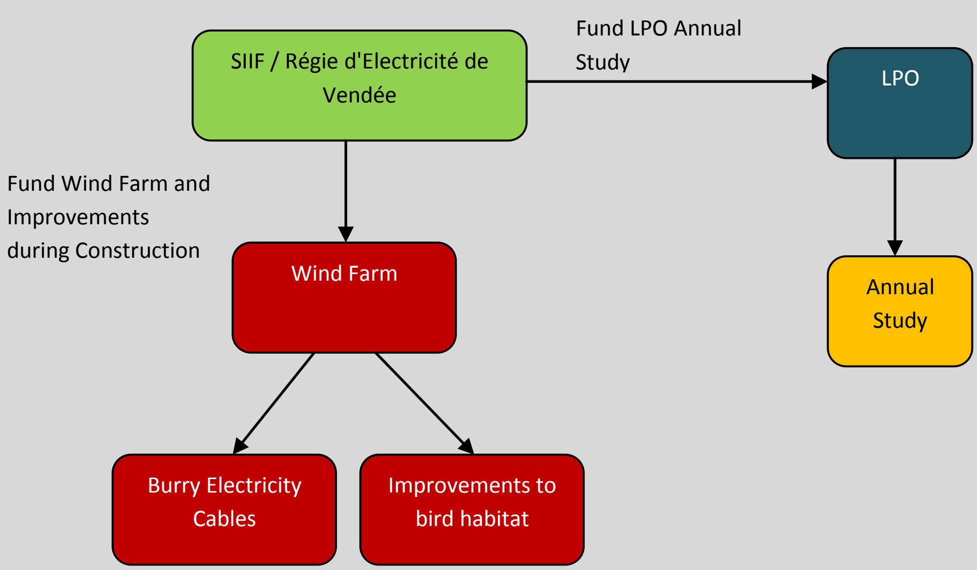
- Based on the Impact analysis (Table 4), we observe that the impact of compensation on mitigating has mainly a large impact on environmental resistance.
- Compensations can take the form of landscape restoration (Cruach Mhor, Scotland, UK), or of road reinforcement and restoration (Estinnes, Belgium).

Impact Table of the **Compensation** Benefit Sharing Mechanism on Community Resistance to energy cases.			
	Motives of Community Resistance to Energy Projects		
CASE	**Environment**	**NIMBY**	**Opportunism**
Cruach Mhor	+++	n/a	n/a
Le Haut-des-Ailes	n/a	+	+
Bouin	+++	0	0
Lake Ostrowo	+++	n/a	0
Estinnes	+	++	0

Table 3: Impact Table Compensation

Compensation Example: Bouin

During the planning phase of the Bouin wind farm in France LPO, a bird protection agency, filed a lawsuit against the development. The wind farm was being developed nearby a bird habitat. The developer (SIIF / Régie d'Electricité de Vendée) agreed to take certain compensatory measures to help protect the local birds. These include burying electricity cables, agreeing to a ban on hunting certain birds in the vicinity of the wind farm and constructing certain improvements to the bird's habitat. Additionally an annual study is performed by LPO and funded by the developer to analyse the impact of the wind farm on the bird population.



2.2.4 Benefits in Kind

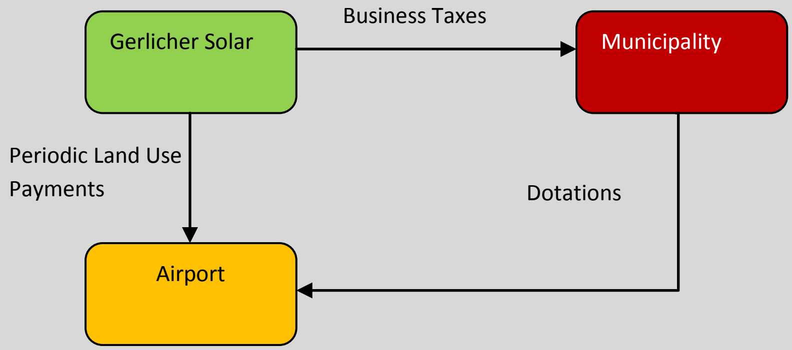
- Based on the Impact analysis (Table 5), we observe that benefits-in-kind have varied impacts on mitigating resistance motives. We observed that benefits-in-kind are designed to target specific issues at stake and accompany other benefit sharing mechanisms as complementary actions. Benefits-in-kind can take the form of social support for retired population, educational and cultural programs for young people (EDP Hydro Projects in Sabor, Tua and Fridao, Portugal) and/or a school bus, financial contribution to a yearly school/regional festival (Lake Ostrowo – Lake Ostrowo Wind Farm, Poland).

Impact Table of the **Benefits in Kind** Benefit Sharing Mechanism on Community Resistance to energy cases.			
	Motives of Community Resistance to Energy Projects		
CASES	**Environment**	**NIMBY**	**Opportunism**
Eastgate	n/a	n/a	n/a
Cruach Mhor	++	n/a	n/a
Evolis	n/a	n/a	n/a
Lake Ostrowo	+	n/a	+
Estinnes	+	+++	n/a
EDP Hydro Projects	+	+++	n/a
PV Soundless	n/a	n/a	n/a
Solar Park Rothenburg	n/a	n/a	n/a
Surano Nursery School	n/a	++	n/a
Barba Lecce	n/a	++	n/a

Table 4: Impact Table Benefits-in-kind

Benefits-in-Kind Example: Solar Park Rothenburg

The local airport was threatened with closure. The large solar park developed on the airport area provides periodic payments for the use of the land from the developer Gehrlicher Solar. Together with the business taxes paid to the municipality the airport can remain open and local jobs are saved.



2.2.5 Local Contracting

- Based on the Impact analysis (Table 6), we observe that local contracting may have a positive impact on mitigating resistance due to NIMBY (Texel Energy, Netherlands) and positive impact on mitigating resistance due to opportunism.

Impact Table of the **Local Contracting** Benefit Sharing Mechanism on Community Resistance to energy cases.			
	Motives of Community Resistance to Energy Projects		
CASE STUDY	**Environment**	**NIMBY**	**Opportunism**
Eastgate	n/a	n/a	n/a
Cruach Mhor	0	n/a	n/a
Altahullion	n/a	n/a	n/a
Samsø	n/a	0	n/a
Le Haut des Ailes	n/a	+	+
Texel Energy	n/a	+++	+
Estinnes	0	++	+
Solar Park Rothenburg	n/a	n/a	n/a
Surano Nursery School	n/a	++	n/a
Barba Lecce	n/a	++	n/a

Table 5: Impact Table Local Contracting

2.2.6 Local Employment

- Based on the Impact analysis (Table 7), we observe that local employment may have a positive impact on mitigating resistance due to NIMBY and opportunism.
- Further research is suggested on the impact of the employment contracts to overall community benefits, to the relation between the impact on mitigating community resistance with the type of employment contracts (maintenance jobs, technical positions etc) and the number of employment posts.

Impact Table of the **Local Employment** Benefit Sharing Mechanism on Community Resistance to energy cases.			
	Motives of Community Resistance to Energy Projects		
CASE	**Environment**	**NIMBY**	**Opportunism**
Eastgate	n/a	n/a	n/a
Svartsengi	n/a	n/a	n/a
Cruach Mhor	0	n/a	n/a
Altahullion	n/a	n/a	n/a
Varese Ligure	n/a	0	n/a
El Hierro	n/a	0	n/a
Amareleja	n/a	n/a	n/a
Samsø	n/a	+	n/a
Le Haut des Ailes	n/a	++	+
Bouin	0	++	+
Texel Energy	n/a	+++	+
Estinnes	+	+	+
Solar Park Rothenburg	n/a	n/a	n/a
Surano Nursery School	n/a	+	n/a
Barba Lecce	n/a	+	n/a

Table 6: Impact Table Local Employment

2.2.7 Energy Price Reduction

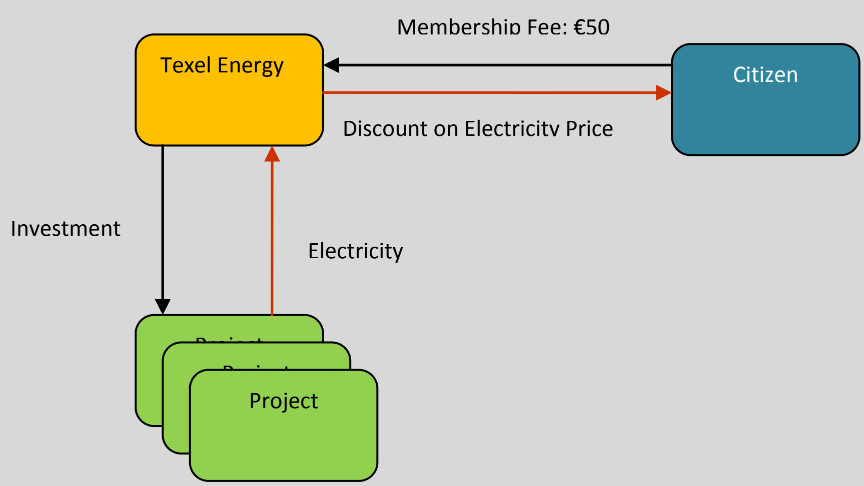
- Based on the Impact analysis (Table 8), we observe that energy price reduction may only have a positive impact on NIMBY and opportunism. In the cases it was used a complementary mechanism to other BSMs such as local ownership (Texel Energy, The Netherlands).

Impact Table of the **Energy Price Reduction** Sharing Mechanism on Community Resistance to energy cases.			
	Motives of Community Resistance to Energy Projects		
CASE	**Environment**	**NIMBY**	**Opportunism**
Svartsengi	n/a	n/a	n/a
Texel Energy	n/a	+	+

Table 7: Impact Table Energy Price Reduction

Energy Price Reduction Example: Texel Energy

Texel Energy is a small-scale renewable energy provider based on the island of Texel in the Netherlands. The company strives to develop renewable energy sources on the island and ultimately make the island self-sufficient. However also non-islanders can become a customer of the company. Both locals and non-locals can also become a shareholder by first becoming a member of the company for the one-time fee of €50. Customers who are members enjoy a discount on the energy supplied by Texel Energy.



2.2.8 Indirect Benefits

- Based on the impact analysis (Table 9), we observe that indirect benefits may have low to moderate positive impact on mitigating resistance due to landscape issues and environmental concerns. Indirect benefits that mitigated landscape issues can take the form of ecotourism paths around or along energy plants (Case 11, Le Haut des Ailes – Le Haut-des-Ailes, France and/or Case 15, Texel Energy – Texel Energy, the Netherlands).

Impact Table of the **Indirect benefits** on Community Resistance to energy cases.			
	Motives of Community Resistance to Energy Projects		
CASES	**Environment**	**NIMBY**	**Opportunism**
Eastgate	n/a	n/a	n/a
Svartsengi	n/a	n/a	n/a
Altahullion	n/a	n/a	n/a
Varese Ligure	n/a	++	n/a
Le Haut des Ailes	n/a	+	0
Bouin	0	++	0
Evolis	n/a	n/a	n/a
Texel Energy	n/a	+	0
O2	n/a	0	n/a
Estinnes	0	+	0
Solar Park Rothenburg	n/a	n/a	n/a
Surano Nursery School	n/a	0	n/a
Barba Lecce	n/a	0	n/a

Table 8: Impact Table Indirect Benefits

3. Conclusions and recommendations

The EU objective of realising a share of 20% renewables in 2020 will result in energy production becoming more visible for all of Europe's citizens. The transition to a sustainable energy economy entails a large amount of siting decisions still to be made. Policy-makers and local authorities should clearly back this transition and state that new RES projects are indispensable for a sustainable energy provision. When the legitimacy of their project is not contested, developers can concentrate on the specific challenges the project poses.

'Acceptance' often plays a crucial role in the feasibility of a RES project, both directly and indirectly. Also legal, financial and technical issues may in fact represent acceptance issues. If a technology is not understood this can have an impact on acceptance. The legal obstacles developers face can be the result of low acceptance.

Acceptance can be addressed effectively through smart application of so called 'benefit sharing mechanisms' (BSM). Benefit sharing mechanism are methods that allow project developers to transfer benefits to the local community hosting the project.

In practice, BSM are not only used to address acceptance issues. Benefit sharing mechanisms can for example be used as a tool for attracting additional finance or increasing the scale of a project, as proven by the various co-operatives active in Member States. Various co-operatives and private developers, established in the past 10 years, actively apply benefit sharing mechanisms as part of the project's and organisation's philosophy. Presentations made during the 18th November REShare seminar in Brussels also made clear, that particularly in the area of Renewables there is a potential for meaningful involvement of local communities. The application of BSM to address financial and acceptance challenges at the same time offers a unique opportunity for RES projects to meet the 20% ambition of the EU. Initiatives that are still relatively small at present, prove a willingness of citizens and communities to invest in sustainable energy. A potential to be used here.

This study has identified the following mechanisms: Community funds, local ownership, compensation, benefits in kind, local employment/contracting, reduced energy prices, indirect social benefits. These mechanisms have an impact on acceptance issues related to environment, NIMBY and opportunism:

- Community Funds particularly offers a positive impact on the mitigation of resistance due to NIMBY effects in the community. Examples from the case studies show that local funds represent up to 10% of the community budget. For larger communities there is reason for earmarking of funds to ensure visibility of the link between the RES project and local investments. A national tax does not generate local acceptance.

- <u>Co-ownership</u> creates a high level of involvement. They typically address NIMBYism but can also be an effective tool for scaling up activities. This is particularly important as many RES projects are still in a development phase. Co-ownership also has a clear link to opportunism however.
- <u>Compensation</u> can be an effective tool to address environment as well as NIMBY issues. Compensation takes many different forms including individual monetary compensation for direct material losses. In this case it is important to avoid any opportunistic behaviour (incentives to ask for more in any following project).
- <u>Benefits in kind</u> offer the opportunity to address different specific local needs (social agenda, education, business development etc.) and can be used to address both NIMBY and Environmental aspects. Benefits in kind may also decrease opportunities for opportunism. Benefits in Kind can effectively be used by a project developer if the character of the benefits matches with the background of the developer (transfer of available know how, e.g. on sustainable business development).
- The mechanisms of <u>local employment and local contracting</u> reduce resistance due to NIMBY and to some extent opportunistic behaviour. One should distinguish between short (during construction) and long term effects. Investment in 'local' skills rather than short term ad hoc can ensure a sustainable impact on acceptance.
- <u>Energy price reduction</u> can address both NIMBY and opportunistic behaviour through a direct financial mechanism. It is a direct commitment that improves the business case.
- Depending on the characteristics of the project <u>indirect benefits</u> has an impact on NIMBY. Various projects show the importance of RES plants as touristic attraction or as a visible part of a total sustainability image of a region. There is a positive impact on the mitigation of resistance due to NIMBY if the energy project is being accepted by the community as a prestigious landmark.

The mechanisms are applied as an instrument to develop an 'enabling environment' for RES projects at the local level. Benefit sharing mechanisms can be financial and non-financial. It is crucial that the policy environment does not mix up benefit sharing with 'the right for compensation'. This not only creates false expectations but creates the impression that the transition from a fossil-based to a sustainable economy is a 'nice to have' instead of essential for future energy provision. Getting something 'in return' should therefore not become an automatism when a siting decision needs to be made. This can only be the case when a clear and identifiable individual loss is present (i.e. resettlement, lower property values etc...).

3.1 Case study analysis

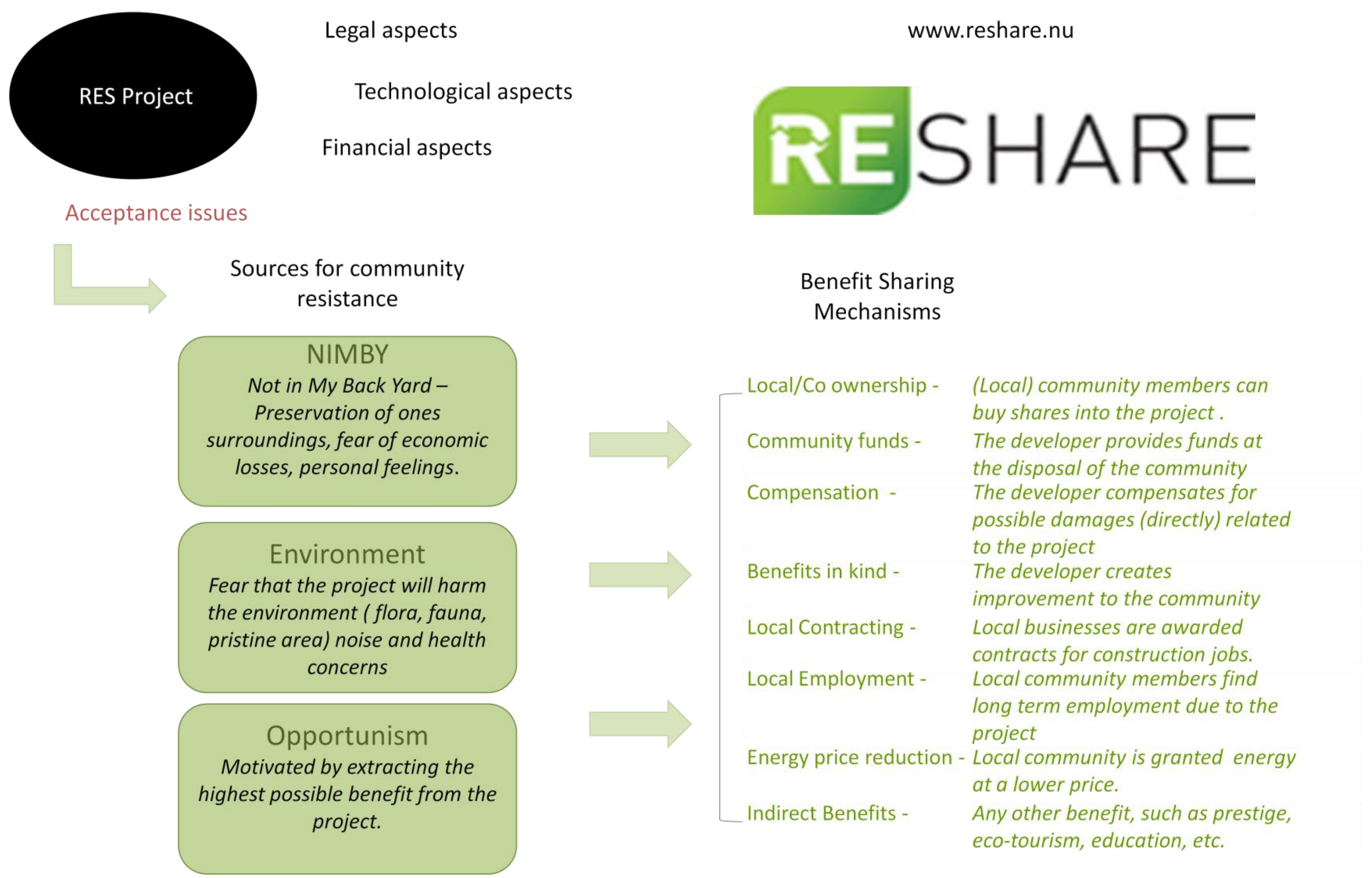
The case studies have been analysed through a so called matrix evaluation in order to assess the effect of the different mechanisms on the different categories of resistance. The table summarises the results of the analysis.

Table 10: Summary of the Impact tables energy cases.

Mechanism	Environment	NIMBY	Opportunism
Community funds	+	++	+
Local ownership	0	+++	++
Compensation	+++	+	0
Benefits in kind	+	++	+
Local contracting	0	++	+
Local employment	0	++	+
Energy price reduction	n/a	+	+
Indirect benefits	0	+	n/a

The table above suggests that benefits which benefit individuals rather than the community seem to have the most effect on more ‘personal’ motivations for resistance such as NIMBY and Opportunism. This is for example markedly the case for local ownership. Community-wide benefits seem however more capable of tackling multiple issues. As suggested in the literature review, people seem find it easier to think in terms of ‘public harm’ being compensated by a ‘public good’ which generates a broader level of support. Community-wide mechanisms are also less prone to address opportunistic resistance, although it cannot be excluded.

For a useful interpretation of the above any user should be aware that the respective mechanisms themselves differ substantially from each other. Actual possibilities for application of BSM will depend on local circumstances, project characteristics, project seize, legal aspects etc. Therefore usage of the RESHARE database is recommended for more background information and references.



When planning for a project which will harvest a Renewable Energy Source, there are Legal, technological and financial aspects which need to be dealt with. A bottleneck that is particularly hard to tackle is the issue of acceptance. RES projects may affect local communities, and therefore invoke a reaction, one which is usually against the project in that specific location. REShare gives insight in how various methods of Benefit Sharing Mechanisms (BSM) can be applied to create a basis of acceptance in local communities. A schematic overview is given below, linking the BSM to exemplary projects in our best practices database. General critical factors when introducing BSM:

•Focus on local needs, an urban community will differ greatly from a rural one.
•Look for a good match between the Benefit Sharing Mechanism used, the background of the project and the developing company skills.
•Communicate extensively and clearly with the community what your plans are at an early stage, and listen to what they have to say in response.
•Be clear about your intentions when it comes to the Benefit Sharing Mechanism applied and Monitor the impact
•When using financial Benefit Sharing Mechanisms (s.a. co-ownership), be aware of the possibilities to use this as a financial inflow, which can increase the scale of the project.
•When using financial Benefit Sharing Mechanisms (s.a. compensation) be careful with individual compensation that has now impact on community acceptance

www.reshare.nu

3.2 Recommendations

3.2.1. RES Project developers

The following general lessons apply for the implementation of benefit sharing mechanisms on a project level (smart application of BSM). These recommendations particularly address RES project developers:

1. Engage in dialogue with the local community at an early stage, before any decision-making and construction, that addresses the acceptance issue(s) foreseen.
2. Choose a mechanism/mixture of mechanisms that not only corresponds to the aforementioned dialogue, but also fits with the background of the company and the size and characteristics of the RES project. Integrate application of BSM as part of the company strategy.
3. Combine acceptance and financing when possible
4. Refrain from mechanisms that include large technology risks for citizens
5. Compensate the environmental/landscape impact rather than individual citizens
6. Address local development needs, not a (never ending) 'wish list' . A "needs-assessment" is advisable for larger projects. Integrate local initiatives if possible
7. Consider also long term effectiveness of mechanisms applied. Impact on acceptance should have a sustainable impact
8. Manage expectations and remain open and transparent about possible negative impacts. Make acceptance issues and the related objectives of the BSM explicit.
9. Evaluate impact of the mechanism and exchange experience within the RES sector
10. Share experiences with other RES project developers

3.2.2. Policy Makers

At the same time authorities must establish an enabling structure for implementation of BSM at a local level through:

1. Consistent message from central and local administrations regarding the legitimacy of RES projects
2. Know how support for small scale initiatives (fiscal and legal requirements, allowed co-operation structures), support pioneering activities
3. An attractive fiscal climate for local participation mechanisms and direct use of RES energy; no taxes for revenues below certain threshold, simple tax administration
4. Priority access of renewable energy to the grid, investments in local networks
5. Low bureaucracy/transaction costs for common ownership structures and facilitation of (bank) loans for participation
6. Use of locally produced renewable energy in the public domain
7. Local contracting and procurement including sustainable energy criteria
8. Support additional costs for technology risks that cannot be beard by citizens or project developers (guarantee, loan, subsidy)

9. Refrain from legal obligations on participation that have a negative impact on the business case of Renewables compared to existing conventional capacity.
10. Allow for local financial participation structures at the local level; avoid that the lack of an institutionalized approach for benefit sharing is a bottleneck for project realisation ant the local level

No single organisational structure or format can ensure a successful application of BSM. Smaller projects, communities and the companies involved would however benefit from experience built up elsewhere. Both the public and private sectors would benefit in making information of both the successful and unsuccessful application of BSM available to other project initiators.

A particularly important question, which cannot be answered yet, is the possible added value of legal obligations for participation as practiced in Denmark for large wind projects and in Norway for large hydro projects. On one hand a clear legal framework on participation can help to establish a clear institutional framework for RES projects, on the other hand one should be reluctant with legal obligations for RES projects that are not applied for 'competing' conventional energy projects.

3.2.3 Further research

This study is based upon a literature review and an assessment of 23 cases. Although earlier research has been carried out on acceptance issues, particularly for wind energy, they focussed more on the 'soft' mechanisms such as communication and transparency. Little research has been conducted on the specific application of benefit sharing mechanisms in Europe.

Based on the experiences gathered in this study, recommendations were made for project developers and policy makers in how to use, or enable the use of, benefit sharing mechanisms. Research in this area however need to be deepened and broadened:

- More case study analysis would be needed in order to further assess the effectiveness of certain mechanisms
- Ideally some RES projects/pilots should be assessed from the start, allowing for a quantitative evaluation of the impact that a specific mechanism has on a particular form of resistance
- There is a clear relationship between financial, legal, technological and acceptance issues and it would be useful to further explore these interactions
- We concluded that so far no single success formula/ format exists; however RES projects can profit from insight in the actual mechanisms applied elsewhere. A knowledge-sharing platform is recommended.
- The added value (if any) of legal obligations for participation while ensuring a fair level playing field with conventional energy projects.

Annex 1. The Reshare website

Figure 3: The home page www.reshare.nu

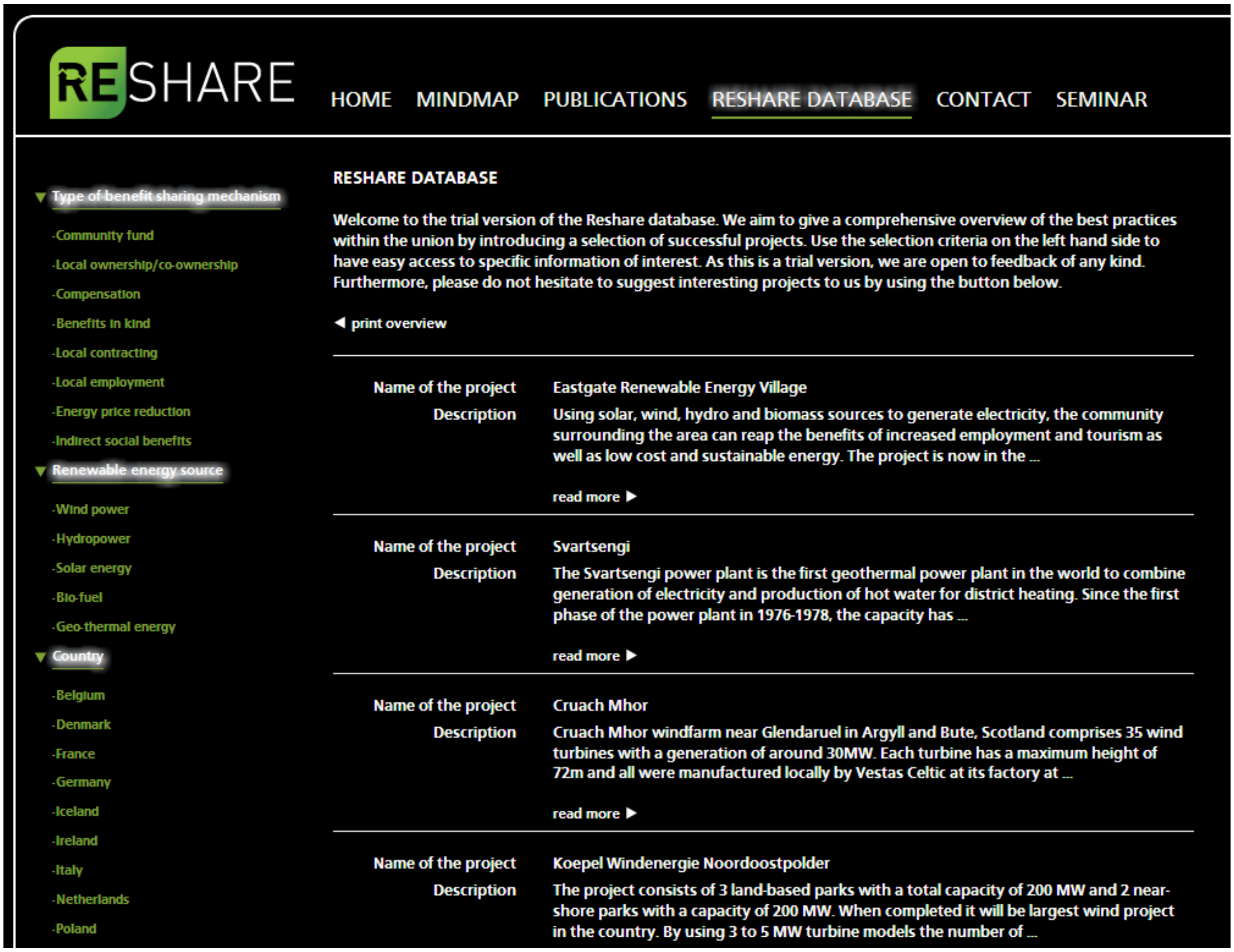


Figure 4: The Reshare database

Annex 2. Case Study Template

1. Background information

Name of the project:

Country:

Short description of the project/objective:

Name of project developer:

Start date:

Total investment (€):

Financing sources:

Stakeholders involved in the project

Initiator:

Investor(s):

Who owns the project?

Actors who receive benefits:

Any specific legal background crucial to understand the project:

Other important background information:

2. Type of benefit sharing mechanism

- ☐ Community fund
- ☐ Local ownership/co-ownership
- ☐ Compensation
- ☐ Benefits in kind
- ☐ Local contracting
- ☐ Local employment

☐ Energy price reduction
☐ indirect social benefits

Other (please describe):

3. Renewable energy source

☐ Wind power
☐ Hydropower
☐ Solar energy
☐ Bio-fuel
☐ Geo-thermal energy
☐ other

4. Application of BSM

How does the BSM actually work in this particular project (or combination thereof)?

5. Success Factors

Please describe which factors contributed to the success of the project (i.e. Legislative factors, political support or local community involvement). Focus on the BSM, but broader description can be added if this adds value.

What have the roles of the different stakeholders been? And to what extend was their role decisive?

Please indicate specific difficulties which had to be overcome

6. Impact

Did the BSM of this project have an impact on any of the following acceptance levels?

- Socio-Political: e.g. did it have an impact on the general acceptance of the technology by the stakeholders involved? Were policies adapted due to the project?
- Community Acceptance: did the BSM have an impact on the community acceptance through for example more equitable distribution of burdens and gains? Did the BSM for example help increase the trust in the developer?
- Market Acceptance: did the BSM have an impact on the acceptance by investors or consumers of the technology? Did it lead to best-practices for realising a comparable project?

Planned/actual production of MW by your project:

7. Transferability

Which general conditions (is required in order to successfully apply the mechanism in different countries/regions or under different circumstances?

- Regional /Physical conditions
- Cultural/social conditions
- Legal/institutional/organisational conditions

8. Website

Annex 3: Case studies

Eastgate Renewable Energy Village

Name of the project	Eastgate Renewable Energy Village
Country	United Kingdom
Description	Using solar, wind, hydro and biomass sources to generate electricity, the community surrounding the area can reap the benefits of increased employment and tourism as well as low cost and sustainable energy. The project is now in the finalizing stages of gaining permission to start the development. At this stage the ownership of the area will transfer to the community, free of charge.
Project developer	Weardale Task Force
Start date	30-11-1999
Financing sources	Grant from the dept of energy and climate change.
Initiator	Weardale Task Force
Investor(s)	Lafarge Cement, One NorthEast, local community
Project owner	Weardale Task Force
Actors receive benefits	Local community, non profit organisation still to be created
Legal background	The project is mainly possible because the cement company wished to return the area to the community, free of charge, in a way which would be beneficial to its economic development. Currently, the municipality is in the process of researching any liabilities concerning this transaction prior to accepting it.
Background information	With the departure of the local cement company (Blue Circle was bought by Lafarge Cement UK) from the cement quarry, Eastgate lost a large source of income and employment. It was therefore promised by Lafarge Cement UK. that there would be an alternative use for the location, one that would restore economic benefits in the community. When a geothermal source was found, providing naturally heated water of a quality usable for a spa, the area was immensely attractive to use as a eco-friendly touristic destination.
Type of benefit sharing mechanism	Benefits in kind Local contracting Local employment Indirect social benefits
Renewable energy source	Wind power Hydropower Solar energy Bio-fuel Geo-thermal energy
Application of BSM	Local contracting: The work which needs to be done in the development stages of the project is delegated to local contractors as much as possible, generating temporary employment for the local community. Local employment: As the project will result in a small scale renewable energy showroom, there will be permanent employment in maintenance and operation. Furthermore, there will be indirect effects due to the increased tourism, which will generate jobs in hospitality businesses, as well as other economic activities.

	Indirect social benefits: The project is designed to attract various sectors of tourism, as it provides for a spa as well as a showroom for five different methods for harvesting renewable energy sources.
Roles of the different stakeholders	
	The Lafarge Cement company facilitates the project by donating the area to the community. Local government stimulates the project by streamlining the process of permit application, having a facilitating role between the developers and the local community, as well as providing information to its citizens.
Impact of BSM of this project on socio-political level or market acceptance	
	This project is one of the first in the UK which uses such a large variety of energy sources. If the project works out to be as successful as anticipated, the use of renewable energy sources as a (new) source of income to a region as well as an attraction for tourists, could be stimulated and repeated within the country as well as in the rest of Europe.
Website	http://www.davidlock.com/weardale2/

Svartsengi

Name of the project	Svartsengi
Country	Iceland
Description	The Svartsengi power plant is the first geothermal power plant in the world to combine generation of electricity and production of hot water for district heating. Since the first phase of the power plant in 1976-1978, the capacity has gradually expanded with the addition of three new turbines until 1989. In 1999 and 2006, the oldest two were replaced with new technologies to meet the increasing demand.
Project developer	Surdunes Regional Heating Corp
Start date	01-01-1973
Financing sources	Shareholder equity Subsidies
Initiator	The geothermal commission of Keflavik and Njardvik and the Icelandic Energy Authority
Investor(s)	National and local governments
Project owner	Sudurnes Regional Heating Corp (SRH)
Actors receive benefits	The seven municipalities in SRH and Kevlafic airpo
Legal background	By law, Sudurnes Regional Heating Corporation is owned by seven municipalities surrounding the Svartsengi power plant (60%) as well as the State of Iceland (40%). The ownership by independent municipalities is divided: Keflavik 31,04%, Grindavik 8,11 %, Njardvik 8,70%, Sandgerdi 5,55%, Gerdahreppur 3,76%, Vatnsleysustrond 2,13% and Hafnir 0,71%.
Background information	Svartsengi Geothermal power plant is one of the largest in Iceland. Located in Iceland's Reykanjes peninsula, the plant is built on a lava field dating from a volcanic eruption that took place in 1226. Svartsengi generates energy that provides heated water throughout the southwest peninsula. Geothermal brine that is not used for heating forms the Blue Lagoon, a popular tourists spa. With sustainable energy sources being a main focus for the Iceland community for a very long time, their use of geothermic energy sources for heating as well as electricity supply is roughly 30%. The Svarsengi geothermal energy plant is one of many in Iceland, with a production of 46.4 MW electricity and 150 MW hot water. A by-product of the geothermal activity is the famous tourist attraction Blue Lagoon, providing a naturally heated, steamy hot bath in the middle of a generally quite cool environment. The industry as well as the touristic by product create not only employment opportunities, but also the additional benefits of tourism, with little polution or additional costs. The heat and electricity produced, is provided at very low rates to local households, public buildings, such as the nearby airport and schools. The Blue Lagoon was created accidentally, the water was supposed to evaporate but remained and is said to have healing properties. The sight is immensely popular by tourists, traveling especially to the region to swim in the Blue Lagoon, creating an entire tourism industry with all the financial gains that come with that. The sanatorium near the Blue Lagoon is owned by Sudurnes Regional Heating Corporation as well.

Type of benefit sharing mechanism	Local employment Energy price reduction Indirect social benefits
Renewable energy source	Geo-thermal energy

Application of BSM

Local employment: The power plant and its spin off, the Blue Lagoon, and the tourism industry which surrounds that, created job opportunities for the local community.

Energy price reduction: Svartsengi produces low cost, environmentally friendly heating and electricity for the local communities, whose municipalities own the power plant. Rising oil and gas costs do not affect energy prices in Iceland, which are unsubsidized and amongst the lowest in the world for electricity and heating. Savings in using geothermal energy for heating alone, instead of other forms of energy that would have to be imported, is estimated at USD 460 million per year for Iceland's tiny economy.

Indirect social benefits: A side effect of the power plant has been the creation of the Blue Lagoon, a lake which is known to have healing effects on those suffering from skin decease. The waste heat of the power plant is used to fuel this lake as well as other facilities in the spa which has been built around this Blue Lagoon. The area attrackts a lot of tourism, which leads to indirect social benefits through increased income for the region as well as the infrastructure necessary to maintain the tourism industry.

Factors which contributed to the success of the project

Iceland has a nearly abundant supply of geothermal energy sources, which makes a project of this scale possible. The Iceland government supports the use of this technique as it reduces costs for energy use and decreases dependence on foreign supplied fossil fuels.

Impact of BSM of this project on socio-political level or market acceptance

The Svartsengi geothermal energy plant was the first of its kind in the world. With the successful use of its heat and electricity for such a long time, the power plant has an exemplary function. Especially since the investments are large and need to be made in the beginning of the project, an example like Svartsengi can stimulate other parties to start such an undertaking.

In 2009, the National Energy Authority reported that Icelanders have saved ISK 880 billion (USD 7.2 billion) through geothermal heating since 1970, assuming a two percent real yield. Today, around 90% of Iceland's substantial heating needs are met with geothermal resources.

Planned production of MW by your project

50 MW electricity and 150 MW thermal energy (planned)

Website

http://www.verkis.com/projects/energy/geothermal/nr/1403

Cruach Mhor

Name of the project	Cruach Mhor
Country	United Kingdom, Scotland
Description	Cruach Mhor windfarm near Glendaruel in Argyll and Bute, Scotland comprises 35 wind turbines with a generation of around 30MW. Each turbine has a maximum height of 72m and all were manufactured locally by Vestas Celtic at its factory at Machrihanish. The plant delivers enough green energy for around 17,000 homes – displacing more than 60,000 tonnes of greenhouse gases – and is an important contributor to the UK's target of achieving 15% of energy supply from renewable sources by 2015.
Project developer	Scottisch Power
Start date	14-07-2003
Initiator	CRE Energy
Project owner	Scottish Power
Actors receive benefits	Local Community

Background information	Cowal was selected as an area where there was potential for a windfarm development. A detailed, area-wide site selection process was then initiated in order to select the site with the greatest potential. Three sites were seriously investigated. Scottish Natural Heritage and Argyll and Bute Council were closely consulted during this process. Through a process of elimination Cruach Mhor was chosen as the site with the greatest potential due to the limited area over which it will be seen, combined with a good quality access road already in existence through the forest and ready access to the electricity grid nearby.

Type of benefit sharing mechanism	Community fund Compensation Benefits in kind Local contracting Local employment
Renewable energy source	Wind power

Application of BSM	Community Fund: The community recieves an annual trust of £21.000 (2003 level) for the duration of the operational life of the project. The trust fund is to be held for the benefit of local communities and can be used for charitable, educational or environmental purposes. This trust is now funding a dynamic rural development programme, tasked with revitalising the community ensuring its longterm economic, social, cultural and environmental sustainability. Compensation: Scottish Power will have to set up a bond of £115,000 (2003 level)prior to any work, to ensure that when the life span of 26 years are up, there are sufficient funds to return the land to its former glory. Benefits in Kind: An interesting element of the windfarm's development was an innovative habitat management programme for the benefit of hen harriers, short-eared owls and black grouse. Almost 300ha of commercial forestry was felled with the aim of regenerating grassland and heathland habitats suitable for the birds. Local Contracting: During the construction phase, approximately 100 jobs have been created for the purpose of infrastructure works etc. These employment contracts were made for a period of 12 months and were tendered for 3 million GBP.

The contract to build the 35 wind turbines has been awarded by Scottish Power to Vestas-Celtic Wind Technology, based at Machrihanish near Campbeltown. The turbines are the company's type V52-850kw. The contact brought an estimated £15million into the Argyll economy.

Local Employment: The projects employs 3 full time employees for maintenance and operation works.

Factors which contributed to the success of the project

Communication between the local community councils and ScottishPower was initiated in January 2001. This was the first stage of the consultation process, which was initiated to ensure that the local population had the opportunity to raise any issues which could then be investigated in the Environmental Impact Assessment.

Roles of the different stakeholders

Scottisch Power: The councils and communities of the locations which they were scouting for this windpark, of which Cruach Mhor was finally chosen, were included in the decision making process very early, making it possible to provide tailor made solutions for any obstacles they may see.

Difficulties which had to be overcome

Environmental: Wind-watch, an organisation in the UK, has warned about the environmental impact of realising all the planned wind farms in the Outer Clyde Estuary, which includes Cruach Mhor, would have an unnaceptable impact on the environment.

Planned production of MW by your project 30 MW

Website http://www.scottishpowerrenewables.com/pages/cruach_mhor_windfarm.asp

Koepel Windenergie Noordoostpolder

Name of the project	Koepel Windenergie Noordoostpolder
Country	Netherlands
Description	The project consists of 3 land-based parks with a total capacity of 200 MW and 2 near-shore parks with a capacity of 200 MW. When completed it will be largest wind project in the country. By using 3 to 5 MW turbine models the number of individual turbines is planned to be around 80-100. All five parts of the project are maintained and monitored by Windkoepel Noordoostpolder, an organization which consists of all the various investors (including private citizens), landowners and municipal governments.
Project developer	KoepelNOP
Start date	01-01-2000
Financing sources	Shareholder Equity Subsidies (SDE and Investment Subsidy) Debt Financing
Initiator	Various local organizations, mainly farmers and land owners
Investor(s)	Government subsidies of 880 million to be paid over 15 years, 116 million to be paid in two tranches, ,furthermore there will be debt financing of approximately 400 million through banks and 100 million private equity of which 75% is available for participation.
Project owner	Windkoepel Noordoostpolder
Actors receive benefits	Shareholders

Legal background: Local farmers were placing wind mills on their property in the beginning of the 90's, which urged the local government to introduce new legislation which regulated the placement of these wind turbines, as the scattered layout would pollute the scenery of the area.

Background information: The initiative for starting this project comes from local land owners and farmers, who incorporated themselves into small cooperatives to build windmills on their own land. The municipality rejected these initiatives and placed them in broader perspective by starting the process of developing a big wind farm; yet still involving the farmers. The 3 projects on land are owned by these landowners and the benefits will therefore be divided by them.
Participation in the project by the communities Noordoostpolder, Lemsterland and Urk is only available for the part which stands offshore.

Type of benefit sharing mechanism: Community fund
Local ownership/co-ownership

Renewable energy source: Wind power

Application of BSM: Community fund: The municipalities of Nagele, Tollebeek, Espel, Creil and Rutten will recieve an annual amount of 10.000 euro for a period of 20 years. This money can be used for local projects and activities.

Local ownership: All the citizens of the Noordoost Polder and the municipalities of Urk and Lemsterland can participate in two out of five parts which make up this project. The participation schemes have not been defined yet, but should be made available in various sizes and amounts of risk exposure, so that everyone can participate. The aim is to have a maximum of 20% of the project owned by local citizens.

Co-ownership: The initiative for the park came when various land owners and famers in the region wanted to install new wind turbines on their land or replace existing ones. In return for combining these initiatives in a larger park, the individual parties are combined in cooperatives, owning three of the five parts in this project.

Factors which contributed to the success of the project

Governmental support was crucial in the subsidy process, as this allowed for an adaptation in the subsidy regulations regarding the SDE, which led to a higher amount (total of 880 million instead of 693 million) of subsidy to be granted to the project. Furthermore, an additional subsidy in the amount of 116 million was granted to the project for its innovative nature.

The government also played a role in the fute between the Windkoepel and neighbour community Urk. To make a concession against the opposition in this municipality, the government decided to remove the 7 turbines located closest to them from the original plans and include them in the participation scheme.

Roles of the different stakeholders

Farmers and Landowners: initiated the process of replacing old turbines or installing new ones on their land. After the idea was launched to combine these initiatives in one structured wind park, they accepted a participative role and combined their efforts in cooperatives, responsible for the development of part of the project.

Municipality: ensured the various individual initiatives were grouped allowing for a larger scale project, and plays a facilitative role between the project, the community and the national government.

National Government: this park will be the largest in Europe, with a substantial contribution to the CO2 reduction targets the government aims for. The national government facilitates the project by providing subsidies, structuring the legislative aspects of the park and all permits involved as well as extensive communication with opposing parties.

Difficulties which had to be overcome

Due to combining various individual initiatives in one, large project, there was much more legislation to take into account then would have been the case if each wind turbine was viewed individually. For example, research on the effects of such a large park on the local environment, e.g. the bird population.

An issue has been the opposition from the citizens of the municipality of Urk, located closely to the project, but without any legislative authority as the project is not on its grounds. This municipality feels that the project will harm its historical appearance severely and therefore objects to its existence. Introducing a participation mechanism to the Urk population has not been effective in reducing this opposition to a more acceptable level. The government has therefore decided to remove 7 wind turbines which were closely located to their border from the plans.

Impact of BSM of this project on community acceptance

Community fund: The five municipalities to whom the community funds are paid out are the ones with the most effect of the wind park on their view.
Local ownership: Owning a part of the project, or the possibility to, develops a broader base for acceptance as the community reaps part of the benefits of the wind park and therefore experiences less annoyance from the negative effects, such as sound and sight effects.

Co-ownership: The land owners get to keep their stake in the project, just as if they would have developed it themselves. Their involvement allows the project to be developed, as they provide the land. If they would not have been able to do this, they would have been a difficult source of resistance, as they own the land on which part of the park is built.

Impact of BSM of this project on socio-political level or market acceptance

There is impact on the socio-political level, as this project encouraged cooperation between the national and local government, the various municipalities and the local community members involved as a method to realise local initiatives.

Planned production of MW by your project 430 MW

Website www.windkoepelnop.nl

Altahullion Wind Farm (I and II)

Name of the project	Altahullion Wind Farm (I and II)
Country	Ireland
Description	Altahullion is one of the largest wind farms in the UK, with a total of 19 turbines generating enough electricity for 20.000 homes. The project developer, Renewable Energy Systems, is a large global player in the development of large wind parks.
Project developer	Renewable Energy Systems
Start date	01-01-2003
Initiator	Renewable Energy Systems
Project owner	RES-Gen Ltd.
Actors receive benefits	Local community and Renewable Energy Systems

Background information RES is a major player in the renewable energy market with a global presence. The aim of the company is to increase its production, while maintaining strong support from the community. There are various schemes employed to enable this relationship, including extensive consultation rounds, job creation, educational facilities and community funds.

Type of benefit sharing mechanism
Community fund
Local contracting
Local employment
Indirect social benefits

Renewable energy source Wind power

Application of BSM Community fund: The Fund is divided equally between three community groups local to the wind farm, all of which are registered charities. The groups were chosen due to their proximity to the wind farm and following consultation with the local community and their representatives. Initiatives which received support from the fund are the creation of a new community riverside pathway and footbridge , entertainment activities for family fun days, summer schemes for local children as well as maintenance and running of community buildings.

Local contracting: During the construction phase of the project, local contractors are used for provision of construction and civil staff, as well as security and catering personnel. These employment contracts are all on a temporary basis.
Local employment: Maintenance and operational staff is employed locally.

Indirect social benefits: The community requested tourist signage, a car park and a path to the turbine. This trail is published in promotional literature for the area, namely Sperrins Tourism and Limavady Borough Council.

Impact of BSM of this project on socio-political level or market acceptance
The application of the community fund in Dungiven and Limavady, the communities closest to the wind park, has been an example in other projects undertaken in the UK with the use of a community fund. Having a working example gives great insight in future applications of such a BSM.

Planned production of MW by your project 37.7MW (planned)

Website http://www.res-group.com/what-we-do/onshore-wind/our-wind-farms/uk--ireland-/constructed/altahullion.aspx

Varese Ligure Sustainable Community

Name of the project	Varese Ligure Sustainable Community
Country	Italy
Description	The four windturbines of the Varese Ligure wind farm were the first installation in the Liguria Region and are amongst the first in Italy. Future plans involve the installation of two additional turbines in order to increase the production by approximately 4GWh per year. The wind farm is part of a 1999 Municipality plan, directed to make the town of Varese Ligure a leading sustainable rural community. The main goals are to reach 100% renewable energy consumption and 100% organic farming. At the moment the turbines provide electricity for 10.000 citizens whereas PV and hydropower systems as well as biomass plants cover the remaining energy needs of the population (2400 inhabitants).
Project developer	Centrogas Energia - ACAM Group SpA
Start date	31-12-2000
Total investment (€)	1.800.000
Financing sources	30% Regional Fund and 60% Private Fund (Municipal Agency)
Initiator	Local Authority Varese Ligure
Investor(s)	Municipal Agency Centrogas Energia - ACAM Group SpA
Project owner	Municipal Agency Centrogas Energia - ACAM Group SpA
Actors receive benefits	Municipality of Varese Ligure and citizens indirectly

Background information

Since 2002, incentives for wind installations are based on a RES quota obligation for producers/importers of electricity generated from non-renewable sources and the issuing of tradable green certificates (TGCs). The 2009 Regional Energy Plan of Liguria Region sets the objective of 120MW of wind energy by 2015 and promotes a further increase of wind installations, which are now number 30 spread over 12 municipalities with 8 MW of installed capacity.

Type of benefit sharing mechanism: Local employment; Indirect social benefits

Renewable energy source: Wind power

Application of BSM

Local employment: The 'sustainable plan' includes investments in renewable energy as well as setting up organic farming co-operatives and the renovation of the historical centre. It is estimated that 140 jobs have been directly or indirectly created by the sustainable policy, especially in the field of organic agriculture, tourism and tertiary services.

Indirect social benefits: for the first period (2000-2009) , The Municipal Agency offered to the local authority cleaning services (such as cleaning of garbage bins) for a value of € 20.000 plus a direct payment of approx.€ 10.000 annually. The agreement has recently changed and it currently consists of annually fixed direct payment, with which the Municipality has been able to reduce taxes and/ or other municipal tariffs, benefitting the citizens.

Factors which contributed to the success of the project

Strong and early commitment of the municipality toward sustainability which make the town an example for rural communities supported by a favorable national policy.

Inclusion of the wind farm in a sustainable development policy which involved the installation of other renewable energy sources and the revitalization of the historical centre and the promotion of organic agriculture.
Support offered by European, national, regional funds
Active involvement of citizens in the decision making process

Roles of the different stakeholders

Local governments: A key role was played by the Mayor supported by ad hoc committee. The local authority has effectively planned a number of initiatives to shift the energy production towards renewable sources and to revitalize the local economy in a sustainable way.

Developer: the developer had a particular interest to diversify its activities and become active in new fields such as renewable energy
Local community: Positive and prompt answer of the citizens to the challenges of revitalizing and reinventing the local economy.

Difficulties which had to be overcome

The wind farm expansion of two more turbines has encountered opposition from a non-profit organisation, 'Italia Nostra', who has taken the municipality to court regarding the project's high environmental impact. The opposition was caused, in part, by the fact that this wind farm was one of the first in the region. The administrative court has recognised the municipality's right to proceed with the installation's expansion as a part of the italian- and municipality's engagement to respect the Kyoto targets. There has not been a high impact on the land nearby the wind farm. The land is leased, as before, for cattle breeding and the noise produced by the wind turbine has been measured to be less than produced by the 'natural' wind. Other non-profits, such as WWF, have expressed a favourable opinion towards the project.

Impact of BSM of this project on community acceptance

The wind farm and the shift on energy production have been greatly facilitated by the mechanism of consultation and the awareness raising initiatives set by the local authority. In addition, the need to revitalize the declining economy has surely played a role on the ‘willingness to change’ of the citizens. The results obtained by the first projects (wind farms and organic co-operative) helped on increasing the citizens trust on moving forward on the sustainability policy.

Planned production of MW by your project 3,200 KW

Website http://www.acamspa.com/acamcentrogasenergia_vareseligure.asp

El Hierro 100 % RES Island

Name of the project	El Hierro 100 % RES Island
Country	Spain
Description	The project at El Hierro aims at creating a 100% sustainable energy sources island. Using wind turbines, a hydro power plant as well as PV installations and solar thermal collectors, with possible extensions towards biomass, the inhabitants of El Hierro should be independent of fossil fuels in the near future.
Project developer	Gorona Del Viento El Herrio S.A.
Start date	30-11-2004
Total investment (€)	60 Million
Financing sources	Private equity Subsidies
Initiator	The Government of the Island El Hierro
Investor(s)	Public (EU and Regional) and Private, managed by a consortium 'Gorona del Viento S.A.' whose shareholders are: the Island Government, the Canary Island through the participation of the Instituto Tecnico de Canarias (ITC), the utility company UNELCO-ENDE
Project owne	rGorona Del Viento El Herrio S.A.
Actors receive benefits	Stakeholders and the local community
Legal background	The European Commission (DG TREN) granted financial support to a consortium of 7 partners, coordinated by ITC (Instituto Tecnológico de Canarias), to carry out the project 'Implementation of 100% RES Project for EL Hierrio Island – first phase' which objectives were the design and construction of the Hydro-Plant, the installation of the 500m2 of solar thermal collectors, the installation of 50kwp of grid connected photovoltaic systems and the assessment of potential for the exploitation of biomass.
Background information	With 276 km² and more than 10.890 inhabitants, El Hierro electricity demand was mainly covered by a conventional thermal power station (13MW diesel-fired system). The focus on renewable energies (RES) started in 1997 with the approval of the "Sustainable Development Plan" which defined a strategy to become a 100% RES island. After a first phase of studies and planning, the construction of the Wind-Hydro Plant has started, which should be able to cover nearly 80% of the Island's electricity demand. The system is linked to a water desalination plant to fill reservoirs and produce water for irrigation and domestic use. Seminars and campaigns have been run to increase citizens' acceptance of the project and it was decided to directly involve the citizens as co-owners of the wind-hydro plant. The El Herrio was recognized by UNESCO in 2000 'World Wide Reserve of Biosphere" as space which represented an insular development model and laboratory.
Type of benefit sharing mechanism	Local ownership/co-ownership
Renewable energy source	Wind power Hydropower
Application of BSM	Local ownership/co-ownership: Part of the shares of the Island Government in the Gorona del Viento, the consortium created to manage the wind-hydro plant, will be divided into smaller shares in order to offer the opportunity of co-ownership to El Hierro Small-Medium Enterprises (SMEs) and every islander.

Factors which contributed to the success of the project

The Island's characteristics as a 'stand-alone' island, facilitate the implementation of a self sufficient energy system and increase the citizens' involvement in political decisions.

The willingess to cooperate amongst the wide range of actors involved (El Herrio Government, Canary Islands Government, Utilities and Research Centers, citizens).

European Union and regional funding supports and promotes the project to set an example for others islands, giving El Hierro the opportunity to become a 'showcase' for islands and attract eco-tourism.

Organizing awareness-raising campaigns, including the publication of brochures, leaflets and information in relevant journals as well as the organisation of workshops, seminars and prestations in conferences.

Roles of the different stakeholders

The Consortium 'Gorona del Vento' owns and exploits the power station is formed by: - Island Government El Herrio, representing the political commitment and is the essential link for the citizens participation the project; -The Instituto Tecnico de Canarias (ITC) researches innovative solutions; -The utility company UNELCO- ENDESA provides expertise in the technical contruction and management of the plant

Difficulties which had to be overcome

Socio- economic problems were caused by the huge initial investment for a small economy, with little information available in the market as it was one of the first of its kind and the project was of a highly innovative nature.

Furthermore, some technical difficulties had to be overcome, as the power network was not strong enough.

Impact of BSM of this project on community acceptance

Local ownership/co-ownership: Public acceptance of the shift towards renewable energy was increased by the possibility of being directly involved as co-owners of the Wind-Hydro Power Station and the possibility to have drinkable water produced in the island.

Impact of BSM of this project on socio-political level or market acceptance

Due to its scale and wide variety of renewable energy sources, the project has an impact on market acceptance of RES projects due to its exemplary properties.

Planned production of MW by your project

Wind Farm 11, 5 MW, Hydroelectric Substation 11,3 MW, Pumping Station 6MW

Website http://www.insula-elhierro.com/

Amareleja - the world's biggest photovoltaic power plant

Name of the project	Amareleja - the world's biggest photovoltaic power plant
Country	Portugal
Description	In Amareleja, in the interior region of Portugal which largest town is Moura, has been built by ACCIONA the largest solar photovoltaic plant in the world, with a 46MW peak and 10MW average with 93 KW-h per year. The site occupies 250hectares of land and the company owns 320 hectares total. Since 2008, the plant is fully operational and takes advantage of the feed in tariff established in Portugal. The labour was sourced mainly from local population and workers were trained on the job by the company as needed.
Project developer	ACCIONA Solar
Start date	30-11-2007
Total investment (€)	261 Million
Financing sources	Private investment
Initiator	AMPER Solar whose shareholders were Moura City Council (88%), Comoiprel (2%)Renatura Networks.com (10%)
Investor(s)	ACCIONA Solar
Project owner	ACCIONA Solar
Actors receive benefits	Local community

Background information: The Decree-law 33_A of February 16th, 2005 modified the system of feed-in tariffs, establishing a new calculation system with a formula that takes the technology into account, as well as the environmental aspects and the inflation rate through the index of prices to the consumer. In 2007 a new tariff for emerging technologies, such as Concentrated Solar Power and wave energy, was introduced. ACCIONA acquired the total capital of Amper Solar that previously owned the rights to the installation.

Type of benefit sharing mechanism: Local employment

Renewable energy source: Solar energy

Application of BSM: Local employment: The creation of such a pioneering and substantially large project has created employment which was sourced mainly from local population. Workers were trained on the job by the company as needed. An average of 150 workers were employed on the site. A small company was also created in the region to carry out some of the panel assembly. This company continues to assemble PV components for external sale.

Factors which contributed to the success of the project

Highly favorable national legislation with higher feed in tariff for CSP projects

Favorable physical and socio conditions

Roles of the different stakeholders

A key role was played by the project developer who has successfully took up the initiative started by the previous society and has involved and trained local population in the construction process.

Planned production of MW by your project: 64

Website: http://www.best-solar-energy.com/solar-energy/accionas-solar-plant-in-portugal/

Samsø renewable energy island

Name of the project	Samsø renewable energy island
Country	Denmark
Description	In 1997 the Danish Ministry of Energy arranged a competition among Danish islands to become 100% self -sufficient in energy based on renewables. The proposal from the Samsø island was assessed to be the most feasible and realistic. The concept builds on energy saving measures and the following and the construction of eleven 1 MW land based mills, ten 2,3 MW off shore wind turbines and four small straw-fired district heating plants.
Project developer	Samsø Energy company
Start date	01-01-1997
Total investment (€)	Approximately 48 million
Financing sources	Shareholder equity Debt-finance Subsidies from the government
InitiatorS	amsø municipality and Samsø Environment and energy office as response to the competition arranged by the Ministry of Energy
Investor(s)	Land turbines: The total investment was € 9 million. € 7.36 million financed by the farmers owing the land (9 turbines). € 1.64 million financed by a cooperative with 430 shareholders (two turbines)
Project owner	Citizens of the island, the municipality and private investors
Actors receive benefits	Citizens of the island, the municipality and private investors.

Legal background	The Danish law on electricity supply had at that time a provision ensuring a minimum price for electricity produced by wind turbines in the first 10. Thus, the minimum sales price for the first 12,000 KWh was € 0,08 and thereafter it was € 0,06.
Background information	The citizens were involved from the start in the planning of the project and all aspects have been debated continuously. The plans and projects have been adjusted along the road due to input from the local community and at the end the entire community accepted and supported the plans.

Type of benefit sharing mechanism	Local ownership/co-ownership Local contracting Local employment
Renewable energy source	Wind power Bio-fuel

Application of BSM	Co-ownership: Local co-ownership was offered to the citizens of the island in relation to both the land and the offshore wind turbines through cooperatives. Local contracting: In the period from 1998 to 2007 it is estimated that 20 fulltime jobs were created in relation to planning and construction of the projects. Especially when it came to the construction of the land based wind turbines and the district heating plants, local labour was used. However, these jobs do not exist any more, as the projects have been completed. Local employment: Now 6 people are occupied at Samsø Energy Academy advising the island citizens about energy projects and energy saving and sharing the experience gained through the renewable energy island project to the outside world.

Factors which contributed to the success of the project

Local community involvement. The outset of the project was an overall master plan which was approved by the ministry of energy. This has been an important tool throughout the project implementation.

Political and financial support and involvement from the municipality.

Fixed minimum price for the for electricity produced by wind turbines .

Roles of the different stakeholders

It was the municipality that submitted the application for the competition to be renewable energy island. In order to organize the project and involve the citizens, a secretariat was established by a local NGO "Samsø energy and environment office".

Later on, the energy company "Samsø Energy company" was established in order develop the specific projects and ensure the financing. This company was established by the municipality, the local trade organization and Samsø energy and environment office. When the majority of the projects were established the energy company was closed down. A new organization has been established under the name Samsø Energy Academy. Its role is to further develop the project , give professional advice to citizens considering to develop their own projects as well as to disseminate the experience .

Difficulties which had to be overcome

According to the master plan bio gas plants should have been part of the overall project. The island produces sufficient manure and organic waste. However, as the price for electricity generated from bio gas was too low, it turned out not to be feasible.

Impact of BSM of this project on community acceptance

The possibility for the citizens to become shareholders has created a positive attitude towards renewable energy installations in the community.

The focus on renewable energy has encouraged many people on the island to engage in small private projects such as private solar panels and heat pumps.

Impact of BSM of this project on socio-political level or market acceptance

There is great interest from other parts of Denmark as well as internationally to learn from Samsø´s experience. It has created a great deal of "renewable energy tourism". These are frequently visitors from the Far East.

Website http://www.energiakademiet.dk/

Le Haut-des-Ailes

Name of the project	Le Haut-des-Ailes
Country	France
Description	The project consists of 22 wind turbines erected in the Lorraine region. Each turbine has a capacity of 2MW amounting to a total capacity of 44MW. The farm is one of the largest in France and impacts 50 communities, directly or indirectly.
Project developer	Erelia (GDF Suez)
Start date	01-09-2005
Total investment (€)	50 million
Financing sources	Shareholder equity Debt financing Subsidies
Initiator	Erelia
Investor(s)	Local Community, FIDEME
Project owner	Local Community, Erélia
Actors receive benefits	Local Community
Legal background	In France the 'Taxe Professionnelle' is a tax based on the 'rental value' of corporate real estate which accrues solely to the local municipality. This tax has played an important role in making renewable energy projects attractive to rural communities seeking to revitalise the local economy. As rural municipalities are often avoided by enterprises, they lack tax funds to reinvest in community projects. Rural communities, however, often have good locations for wind projects, which induced the interest of developers. The additional funds rural municipalities raised through the 'Taxe Professionnelle' and reinvested in the community has helped increase local political support and community acceptance in France. In 2010 it was announced that the 'Taxe Professionnelle' would be replaced by a tax on the land value of the enterprise. It remains to be seen if this will have an impact on the local political support for new developments
Background information	The regional council from the Lorraine Region, wished to realise a renewable energy project which stimulated sustainable local development and involved the local community. In erecting the wind farm the developer held several consultation phases with the local community ensuring they were fully informed about the new development. The consultation phases included public meetings, setting up stakeholders groups which could be consulted and executing polls. Furthermore, a charter consisting of 12 principles, covering aspects such as noise limits or other nuisances, were agreed upon between the community and the developer guaranteeing a sustainable development. The developer also offered the community the possibility of buying shares in the project, a first in France.

Type of benefit sharing mechanism	Community fund Local ownership/co-ownership Compensation Local contracting Local employment Indirect social benefits
Renewable energy source	Wind power

Application of BSM

Community Fund: the several communities surround the wind farm earn funds from the development in the form of the 'taxe professionnelle' (approx €6000 per turbine per year) which can be spent in the respective communities.

Local Ownership: Le Haut-des-Ailes was the first wind farm in France offering shares to the local community. Shares were offered at the price of € 1000. Shareholder's can expect a return of approximately 7% annually.

Compensation: land owners who host the turbines are compensated in the form of annual land-use payments. A protocol was signed between the developer and the land owners to ensure an equitable distribution of these payments.

Local contracting: part of the investment price was reserved for local companies (mostly engineering and construction companies) during the construction of the farm.

Local employment: 4 on-site full time employees were hired for maintenance of the wind farm.

Indirect social benefits: the community actively tries to promote eco tourism. The wind farm is part of the 'Renewable Energy Route' and an initiative of the organisation "Lorraine Energies Renouvelables".

Factors which contributed to the success of the project

Political support was an essential success factor. The local region wished to stimulate the development of wind farms in the region with a high level of consultation and involvement of the local community.

The developer was very open in its communications with the community, agreeing on several principles before construction began. Thanks to the open communication, clear agreements and benefits offered the community played a decisive role in creating acceptance.

Roles of the different stakeholders

Local Authorities: initiated the concept of a wind farm project with a high level of community involvement and engage themselves to help develop ecological tourism which provides indirect benefits to the community.

Developer: Communicate clearly & invite the community to participate

Municipalities & Region: Initiated the idea of the project where the community would be involved and engaged itself to develop ecological tourism which provides indirect benefits to the community.

Impact of BSM of this project on community acceptance

The host of benefits offered to the community clearly had an impact on the community acceptance of the project. Only 18 months were required between the study phase of the project and acquiring the construction permit, which demonstrates the high level of acceptance for this project.

Impact of BSM of this project on socio-political level or market acceptance

Le Haut-des-Ailes was the first wind farm in France to offer the local community a share in the project. As a pioneering project it provided an example for other comparable projects.

Planned production of MW by your project	44 MW
Website	http://www.ereliagroupe.fr/accueil/nos-parcs-eoliens/le-haut-des-ailes/

Bouin

Name of the project	Bouin
Country	France
Description	The Bouin wind farm consists of 8 wind turbines with two different owners. Three turbines of 2,5MW are owned by the Régie d'Electricité de Vendée, while 5 turbines with a capacity of 2,4MW are owned by SIIF, a subsidiary of EDF Energies Nouvelles. The wind farm completed construction in 2003.
Project developer	SIIF / Régie d'Electricité de Vendée
Start date	01-01-2003
Total investment (€)	23 million
Financing sources	Shareholder equity
Initiator	SIIF / Régie d'Electricité de Vendée
Investor(s)	SIIF / Régie d'Electricité de Vendée
Project owner	SIIF / Régie d'Electricité de Vendée
Actors receive benefits	Shareholders, Municipality, Community
Legal background	In France the 'Taxe Professionnelle' is a tax based on the 'rental value' of corporate real estate which accrues solely to the local municipality. This tax has played an important role in making renewable energy projects attractive to rural communities seeking to revitalise the local economy. As rural municipalities are often avoided by enterprises, they lack tax funds to reinvest in community projects. Rural communities however often have good locations for wind projects, which raised the interest of developers. The additional funds rural municipalities raised through the 'Taxe Professionnelle' and reinvested in the community has helped raise local political support and community acceptance in France. In 2010 it was announced that the 'Taxe Professionnelle' would be replaced by a tax on the land value of the enterprise. It remains to be seen if this will have an impact on the local political support for new developments
Background information	The French department of the Vendée wished to promote renewable energy within the territory. The site in the community of Bouin was identified as ideal due to low population density, good wind conditions, proximity to grid connection and absence of protected zones. After several consultation rounds with the local community the municipality accepted the project to its potential benefits for the local community and the possibilities of new income for the community. When completed in 2003 it was the largest wind farm in France.
Type of benefit sharing mechanism	Community fund Compensation Local employment Indirect social benefits
Renewable energy source	Wind power
Application of BSM	Community Fund: considering the municipality's rural character the additional taxes in the form of the 'Taxe Professionnelle' represents a significant increase in its budget. The additional taxes gained represent approximately 10% of the municipality's annual budget allowing several new public projects to be undertaken.

Compensation: the farm is located near a lake where several unique birds nest. LPO, a bird protection agency, required compensatory measures to be taken before agreeing with the development. These included a ban on hunting certain birds, underground electricity cables and the execution of certain public works on the lake to improve the birds' habitat. An annual study, performed by the LPO and funded by the developers, demonstrates no higher rates of mortality amongst birds since the completion of the wind farm.

Indirect social benefits: the wind farm has had a clear impact on the number of tourists visiting the municipality. Each summer approximately 18.000 cars pass the municipality daily on their way to the south of France but hardly any tourists stopped. Since construction on average 1000-1500 tourists stop daily to visit the wind farm generating income for the local community. The wind farm also served as a prestige project for the community. Besides being the largest wind farm in France at the time, it served as an educational example for other French communities considering their own farm.

Factors which contributed to the success of the project

Political willingness to refocus the economy and create benefits for the community.

Roles of the different stakeholders

The local authorities, and in particular the mayor, have played an essential role in supporting this project and realising benefits for the community. All the benefits to the community are mostly based on the

initiative of the local authorities to promote eco tourism and invest the additional tax revenue on community projects.

Difficulties which had to be overcome

A lawsuit was filed in the planning fase of the project by bird-protection group (LPO), which supported the development but demanded certain compensatory measures be taken. The developer agreed upon the measures which included a ban on hunting certain birds, underground electricity cables and the execution of certain public works on the lake to improve the birds' habitat.

A second lawsuit was filed by "l'Association pour la Sauvegarde et la Valorisation des Pays du Gois", a landscape conservation group. They denounced the 'gigantic and disproportionate' size of the project and its impact on the landscape, and disputed the construction permit. They have however withdrawn their suit in 2005.

Impact of BSM of this project on community acceptance

The direct link between the construction of the wind farm and the increase in tourists and revenues has created a large acceptance within the community for the wind farm.

In a survey in 2003, 94% of the local community approved of the wind farm and 87% of the members of the surrounding community.

Impact of BSM of this project on socio-political level or market acceptance

The project was one of the first large wind farms in France and provided a large amount of funds in the form of local taxes to the municipality. These additional incomes for the municipalities provided a strong incentive for other rural communities to analyse the potential for wind farms in their region.

Planned production of MW by your project	19,5
Website	http://www.bouin.fr/page.php?id=12

Evolis I

Name of the project	Evolis I
Country	Belgium
Description	The city of Kortrijk initiated the Evolis business park with the goal of creating a sustainable innovative park and attract high level employment to the region. In order to create an energy neutral business park and provide renewable energy to the surroundings 4 wind turbines with a capacity of 2 MW were erected by developer Electrawinds.
Project developer	Electrawinds
Start date	01-07-2009
Total investment (€)	13,5 million
Financing sources	Shareholder Equity (Developer, Co-operative) Debt financing
Initiator	Electrawinds, city of Kortrijk
Investor(s)	Electrawinds / Co-operative (Groenkracht)
Project owner	Electrawinds / Co-operative (Groenkracht)
Actors receive benefits	Shareholders, Groenkracht, Local Community, Tourists

Background information

The developer, Electrawinds, has started a co-operative called Groenkracht. Anyone can purchase a Groenkracht share. It is however not possible to become a shareholder of a single project as the co-operative participates in nearly all of Electrawinds' projects. During the study phase of each project the developer holds several meetings with the local community and introduces the possibility of participation in the project through Groenkracht.

During the planning phase of the project the community and tourists also expressed a great interest in visiting the wind turbines. The developer decided to work together with the local city guides for in organising such tours. Additionally each of the 4 turbines is named after one of the 'Dalton Brothers', popular comic book characters from the 'Lucky Luke' comic books as its writer was born in Kortrijk.

Type of benefit sharing mechanism	Local ownership/co-ownership Benefits in kind Indirect social benefits
Renewable energy source	Wind power

Application of BSM

Co-Ownership: through the co-operative Groenkracht, Electrawinds offers citizens the opportunity to participate in its projects. Shares however are not limited to only to the local communities hosting the project but free for all to purchase. The share price is fixed at €125, and citizens are free to purchase as many shares as they wish. Each individual shareholder however is only granted a single vote to maintain an equitable distribution of voting power. Expected returns for shareholders are approximately 6% annually. The possibility to participate is introduced by Electrawinds to the local community in the planning phase of each of its projects.

Indirect social benefits / Benefits in kind: as there was a large interest from the community and tourists to visit the turbines, Electrawinds decided to work together with the local city guides of Kortrijk in organising such tours to one of the turbines which is open for the public. The guides received training from the developer about the technology employed, while the city guides association is sponsored by the developer to organise the tours.

Roles of the different stakeholders The project developer is very satisfied with this project as there was a great will present from the local authority to host the project. The local community was similarly enthusiastic and wished to participate financially in the project through the developer's co-operation. The developer was particularly satisfied with the interest to visit the project and their arrangement with the local city guides. By sponsoring the tours they ensure local support and need not concern themselves with organising it themselves.

Impact of BSM of this project on community acceptance

By offering tours and supporting a local organisation in the city the developer was able to turn the significant interest in the wind turbines from the community into widespread support. By offering the community the possibility of participation and 'personalising' the wind turbines by naming them after local comic book heroes, the attachment to and support for the farm increased.

Planned production of MW by your project 8 Mw

Website http://www.evolisbusinesspark.be/en

Texel Energy

Name of the project	Texel Energy
Country	Netherlands
Description	Texel Energy is a small scale energy company which supplies energy originating from renewable energy sources to consumers on the island of Texel, as well as to those in the rest of the country. The company started out with supplying the energy it purchased from other producers, but has the goal to be self-sufficient in the future, using geothermal, hydro, wind, biomass and solar power. The first step towards this was taken when the first windmill was put in service in the beginning of 2010.
Project developer	Texel Energy
Start date	01-01-2007
Financing sources	Shareholder equity Subsidies
Initiator	A group of Texel citizens, starting up Texel Energy
Project owner	Shareholders
Actors receive benefits	Shareholders, Texel community
Legal background	Texel Energy does not aim at making a profit. It uses the proceeds to invest in the company, which will be beneficial to the local Texel economy. Investments are made in the use of new technology for renewable energy harvesting, such as tidal waves for electricity. The island can be used as an example for other area's, a sort of showroom of various renewable energy projects. The Texel economy will also be stimulated through the creation of jobs within the projects itself.
Background information	Texel energy appeals to the Texel inhabitants due to its small scale. The company has an office on the island, which can be visited freely, customers do not feel the distance they experience with large companies and call centres. With a population of only 13.783 the small scale approach is sustainable. Texel Energy has been successful in their bottom-up strategy as they started out as a small company, located on the island with close ties to their consumers, a method which appealed to their target market and therefore created a substantial consumer base. With a steady income the investments for self generation of renewable energy could be made.
Type of benefit sharing mechanism	Local ownership/co-ownership Local contracting Local employment Energy price reduction Indirect social benefits
Renewable energy source	Wind power Hydropower Solar energy Bio-fuel Geo-thermal energy
Application of BSM	Local ownership/co-ownership: Customers of Texel Energy buy shares by becoming a member, at a fee of €50. This membership allows them to use the energy supplied by Texel Energy at a discounted rate. Memberships can also be purchased by anyone who wishes, without the obligation of becoming a customer.

Local contracting: Texel Energy aims to use local employees for the construction of its expanding business model as much as possible.

Local employment: The goal is to use sustainable energy sources on the island to produce all the electricity and heat required. The harvesting of these sustainable resources will create new employment opportunities. Furthermore, as that most of the shareholders are Texel citizens,each investment made into the company benefits the local economy.

Energy price reduction: When becoming a member, the renewable energy is supplied with a discount.

Indirect social benefits: These stem from the potential Texel has in becoming a showroom due to the innovative technologies Texel Energy plans to put to use in the near future. Even though the island is already a popular destination for tourists, the renewable energy projects will increase this due to its appeal to a broader crowd, and will spread the flow of tourism more evenly towards the colder months.

Factors which contributed to the success of the project

Texel Energy is successful because it used a bottom-up technique, which means that it started small and is proceeding in achieving its goals by taking incremental steps. The first step was to attract investors through co-ownership. Most of these investors are also consumers, making sure there is a steady source of income. The next step is to not only deliver renewable energy, which is purchased from another supplier, but to also produce locally. Wind energy is now produced by Texel Energy and the goals is to take gradual steps towards an island fully reliant on renewable energy sources.

With the bottom-up approach, Texel Energy did not need to look for large investors or apply for large sums of government funding. Slowly but steadily the company can achieve its goals. By staying small it remains true to its initial values, to be a local energy supplier, supplying to the Texel community.

Roles of the different stakeholders

Local consumers enable Texel Energy to develop, as they provide the initial capital through their membership fee and an income base through their consumption.

The local and national government have supplied Texel Energy with subsidies, which are put in place for initiatives which increase the share of renewable energy sources in the total energy supply, as well as initiatives which promote the use of these renewables. Texel Energy applies both these characteristics, and therefore qualified for these subsidies.

Impact of BSM of this project on community acceptance

Community Acceptance: Texel Energy has used the small scale of the Texel community and the value that it places on local initiatives, local companies to develop a strong relationship with its consumers. The fact that the company is founded by locals with an aim to cater to locals creates strong support.

Having a wide scale of renewable energy sources at its disposal, the implementation of the renewable energy projects as it is planned at this point will create a source of knowledge, the local community gains access to this as well.

Impact of BSM of this project on socio-political level or market acceptance

Texel Energy aims to have Texel become a showroom to the world. The method it takes has effect, the first windmill is in use. Texel Energy can therefore be a good example to replicate in other locations, perhaps with similar small communities.

Website www.texelenergie.nl

Lake Ostrowo Wind Farm

Name of the project	Lake Ostrowo Wind Farm
Country	Poland
Description	By summer 2007 the Lake Ostrowo wind farm at Wolin in Zachodniopomorskie Province in northern Poland went into commercial operation. The wind farm consists of 17, 1.8 MW Vestas V90 wind turbines, yielding a total, nominal generating capacity of 30.6 MW and an annual output of approx. 90 million kWh corresponding to the consumption of around 45,000 Polish households.
Project developer	DONG A/S
Start date	01-05-2007
Total investment (€)	Not known
Financing sources	Shareholder equity
Initiator	DONG A/S
Investor(s)	DONG A/S
Project owner	DONG A/S
Actors receive benefits	The municipality

Legal background: According to the Law on Local Taxes and Fees of 12 January 1991, a 2% tax of the of the construction costs of all new production facilities has to be paid to the municipality.

Background information: The Lake Ostrowo wind farm was set up as a Joint Implementation (JI) project supported by the Danish government through the allocation of more than 336,000 ERUs (Emissions Reduction Units) over the period 2008-2012, making it more attractive for DONG Energy, to develop and run the wind farm.

The wind farm has also been successfully integrated into an area with a rich bird life. Several studies were carried out showing that the wind turbines would not impact the birds, and it is checked regularly that they are not disturbed

Type of benefit sharing mechanism: Community fund
Benefits in kind
Indirect social benefits

Renewable energy source: Wind power

Application of BSM: Community fund: A 2% tax of the construction costs of the wind farm was paid to Wolin municipality as required in the Act on Local Taxes and Fees.

Benefits in kind: DONG A/S gives smaller in-kind contributions to the municipality. This have included e.g. a school bus, financial contributions to a yearly Viking festival and clothes to the local soccer club.

Indirect social benefits: During its construction the project created around 100 jobs. Furthermore, the wind farm has become a magnet for tourists. The Wolin municipality has erected a signboard explaining the history and benefits of the project to visitors.

Factors which contributed to the success of the project

The inclusion of the project into the Danish Governments Joint Implementation scheme

The successful integration into a rich bird life area without disturbing the bird life

Difficulties which had to be overcome

DONG A/S is very cautious to ensure that the in kind contributions are not seen as bribe. No in kind contributions were given before all permits were obtained. All request for in kind contributions are assessed by both Polish and Danish lawyers.

Impact of BSM of this project on community acceptance

The project has become quite popular among the citizens in the area. This is illustrated by the fact that 1,500 local residents – a third of the city's population - showed up to celebrate the official opening.

Impact of BSM of this project on socio-political level or market acceptance

The project is seen as an important demonstration project for wind energy in Poland. It is visited regularly by developers and energy companies who want to know more about how wind power can be integrated successfully into both the environment and the energy supply network.

Planned production of MW by your project 90 million kWh

Website http://www.dongenergy.com/jagniatkowo/EN/Pages/index.aspx

O2

Name of the project	O2
Country	Sweden
Description	O2 has developed and built one fifth of all wind power plants in Sweden. They are the biggest electricity producer and owner of land-based wind power. O2's business concept is to build wind farms and sell electricity produced by wind power. O2 intends to do this while aiming for strong returns and with high environmental standards.
Project developer	O2
Start date	30-11-1999
Total investment (€)	Not known
Financing sources	Share holder equity Private equity
Initiator	O2
Investor(s)	O2 and shareholders
Project owner	O2 and shareholders
Actors receive benefits	Communities and shareholders
Legal background	The tax authorities have reassessed some old tax rules and have announced that they in the future will require a tax on the difference between the reduced price the shareholders obtain and the price on the Nordic marketplace for financial trading in electrical power (Nordpool). If this tax becomes a reality, it will probably mean the end of the cooperative structure in Sweden. The expectation of the coming tax has already meant a 90% decrease in the sale of new shares.
Background information	The Company's business is divided into two divisions, Wind Power Development & Sales and Wind Power Production. Within the Wind Power Development & Sales division, O2 develops and builds wind farms for external buyers as well as for O2's own operations. The Wind Power Production division is responsible for the production from O2's operational wind farms.
Type of benefit sharing mechanism	Community fund Local ownership/co-ownership
Renewable energy source	Wind power Geo-thermal energy
Application of BSM	Community funds: O2 has as a general policy to support the development of the local communities where they operate. Funds are allocated to the local community where the wind turbines are established. The size of the funds is based on the actual production of the wind turbines. There are no general rules for the amount of money to be paid to the community funds. This is to be decided for each separate project. The money may be administered by a local organisation or the municipality. However, the funds are not to be used to finance any of the municipality's ordinary obligations. One example of a community fund related to the establishment of a wind park in Rättviks municipality. O2 and the municipality have made an agreement that the municipality receives a certain share of the income from the electricity produced to be spent in the settlement around the wind park. Everybody living in this settlement can apply for financial support for projects contributing a positive development in the settlement. Such projects include everything from concerts to renovation or building of public facilities. The maximum amount to be allocated to each project is €10,000.

Co-ownership: Individuals are offered shares in the wind turbines through cooperatives. Each share costs €700 and gives the right to buy 1000 kWh/year at a reduced price. A household may buy as many shares as needed to cover their total consumption of electricity. On average the shareholders can reduce their electricity costs by €525/year.

Roles of the different stakeholders

O2 possesses legal, commercial and technical expertise

Impact of BSM of this project on community acceptance

Community funds: The community funds give, according to O2, a good platform for a direct contact with the local communities and thereby increased local acceptance.

Co-ownership: The possibility for households to buy shares and thereby obtain a reduced electricity price is supporting a general acceptance of wind energy and is providing additional capital for development of wind projects.

Planned production of MW by your project 2045 MW

Website www.O2.se

Middelgrunden

Name of the project	Middelgrunden
Country	Denmark
Description	In 1996, the Copenhagen Environment and Energy office (CEEO) took the initiative to organise the project after the location of Middelgrunden had been pointed out as a potential site in the Danish Action Plan for Offshore Wind. CEEO is a NGO working to promote a sustainable development in the greater Copenhagen area. The Middelgrunden offshore wind farm is situated on a natural reef 3.5 km east of Copenhagen harbour. The wind farm consists of 20 turbines of each 2 MW. It was established in 2000 and was at the time the world's largest offshore wind farm. The farm was established by and a cooperative with 8,553 members.
Project developer	The public utility Copenhagen Energy
Start date	01-01-2000
Total investment (€)	48.000.000
Financing sources	Private equity
Initiator	Copenhagen Environment and Energy office
Investor(s)	The developer (50%) and the Middelgrunden Wind Tur
Project owner	The developer (50%) and the Middelgrunden Wind Tur
Actors receive benefits	The developer and the private shareholders

Background information: Locally based commitment, along with cooperation between the cooperative, the local utilities, and the municipality of Copenhagen, constituted a significant precondition for the development of the project.

Type of benefit sharing mechanism: Local ownership/co-ownership

Renewable energy source: Wind power

Application of BSM: Local ownership / co-ownership: Half of the wind turbines are owned by the wind turbine cooperative. The cooperative consists of 8,552 shareholders. Most of them are electricity consumers living in Greater Copenhagen. The wind turbine cooperative is established as a partnership. One share corresponds to 1/40,500 of the partnership. Each shareholder has one vote independent of the number of shares he holds. The revenue per share is around € 50/year. The price of the shares is determined on a commerce site on the Middelgrunden website. The price fluctuates around € 350.

Factors which contributed to the success of the project

The local involvement (co-ownership)

Political support from the municipality

No tax when production revenue is less than €400 per year

Simple tax revenue form

Thorough information to and involvement of NGO's the public and the relevant authorities.

Roles of the different stakeholders

The public utility possesses the knowledge about technique, contractor work, etc.

The wind cooperative has the knowledge from the private wind sector, enthusiasm and commitment as well as better contacts with the public and the press.

Difficulties which had to be overcome

The original project consisted of 27 turbines placed in three rows. This layout was criticized and changed based on a public hearing to a slightly curved line and number of turbines was decreased to 20.

In the beginning locals were worried about potential noise Impact from the farm, but after a demonstration tour to a modern on-shore wind turbine, the locals were convinced that there would be no serious noise impact.

The cooperative has joint and several liability which is the common model of ownership for Danish wind turbine cooperatives. The Middelgrunden Wind Turbine Cooperative has minimized the risk of joint and several liability by not being able to contract debt in the partnership. This is ensured in the Bylaws, which maintain that the partnership cannot contract debt, and that the turbines must be adequately insured.

Impact of BSM of this project on community acceptance

Although there was some scepticism in the beginning of the planning phase, only 8 critical responses were received during the final public hearing

Impact of BSM of this project on socio-political level or market acceptance

The Middelgrunden wind farm project has inspired other cooperative owned wind farms as well as the clause in the Danish Act on renewable energy , requiring that all all new wind energy projects offer at least 20% ownership to local citizens (For more information about the Danish legislation, please refer to the Reshare literature review, p. 20)

Furthermore, it has been an important "show window" for Danish wind energy.

Planned production of MW by your project 40MW

Website http://www.middelgrunden.dk/

Estinnes

Name of the project	Estinnes
Country	Belgium
Description	The project consists of a pilot project to demonstrate the feasibility of the new class of "mega-turbine'. Specifically it is designed to demonstrate the cost-effectiveness of the new 7MW turbine class which has the potential to significantly increase the productivity of onshore wind projects. The project, completed, will consist of 11 such turbines.
Project developer	WindVision
Start date	01-01-2000
Total investment (€)	120 million
Financing sources	hareholder Equity (Developer) Subsidies Debt financing
Initiator	WindPark, WindVision, European Commission, WIP Munich
Investor(s)	Shareholder equity: WindVision, Enercon, Subsidies: European Union, Debt financing:
Project owner	WindVision, Enercon
Actors receive benefits	WindVision, local community

Type of benefit sharing mechanism	Community fund Compensation Benefits in kind Local contracting Local employment Indirect social benefits
Renewable energy source	Wind power

Application of BSM

Community fund: the use of public land for constructing the wind farm was prioritised offering yield-dependent rental payments to the municipality which can be used on new community projects.

Compensation: both land owners and owners of neighbouring land (divided into 4 different zones) profit from the revenues of the wind farm, as long as their land is part of overall wind farm zone. Municipal roads which were used for transportation were improved and reinforced providing a better public infrastructure.

Benefits in kind: as several unexploded bombs from World War II are still present in the area, wherever excavations are done a search for explosives is performed by specialists. This ensures no harm to the installation team but also removes future dangers for farmers and residents in the area.

Local contracting: all soil works were contracted to local companies

Local employment: Over 20 new jobs were created for continuous on-site park maintenance and operation. Part of these jobs are jobs for unemployed local people. These are manual labour jobs such as the cleaning of roads, cleaning green areas, etc.

Indirect social benefits: the pilot character of the project and the enormous capacity of the turbines has generated a lot of interest from tourists and sector specialists. Tourism-related businesses such as restaurants are profiting from this increase in tourists.

Factors which contributed to the success of the project

EU support: although small it helped significantly in reducing the margins on bank debt for a pilot project with a new technology. It also helped create credibility towards the project.

Political support from the local authorities

Roles of the different stakeholders

Local authorities played an important role in the process as an intermediary between the developer and the local population. By lending their support for the project they increased the developer's credibility.

Support from the neighbours living next to the development also played an important role, as the people 'impacted' the most by the development showed their support.

Difficulties which had to be overcome

The main difficulty with the project was due to its pilot character. There was no previous experience with turbines so large which raised concerns of landscape pollution, also for the neighbouring communities. It was necessary to create simulations of the visual impact and compare them to the impact of 'normal' wind turbines.

A few residents backed by the protest group 'Vents-de-raison', who oppose large on-shore development, resisted the development and raised their concerns in an open letter to the European Commission.

Impact of BSM of this project on community acceptance

The equitable distribution of land rentals, not only to the owners of the land, but also to the neighbours helped create a broad base of support for the project. Also the increasing revenues of tourism to the site played a significant role.

Impact of BSM of this project on socio-political level or market acceptance

Noise had been a concern raised by some people of the community which led to the definition of allowable noise emissions in Belgium. Future wind developments will profit from the experience of this project.

Planned production of MW by your project 77

Website www.7MW-WEC-by-11.eu

Hydro Projects - Local ownership improvement programs

Name of the project	Hydro Projects - Local ownership improvement programs
Country	Portugal
Description	EDP -Energias de Portugal- is developing a new approach directed to increase the community acceptance of large Hydro Projects. The methodology aims to initiate an open dialogue during the entire project in order to understand the local expectations of the project, adjust the companys' projects and to strengthen the actions from the EDP Foundation.
Project developer	EDP
Start date	01-08-2008
Total investment (€)	N/A;
Financing sources	Promoter of construction / EDP
Initiator	EDP
Investor(s)	EDP
Project owner	EDP
Actors receive benefits	Local community

Background information

In 2006, 74% of Portugal's total renewable energy production was from hydropower plants and the Government has announced the intention to award 10 new hydro plants with a total capacity of 1,096 MWs. The following measures are available in Portugal to further stimulate the hydro market: fixed feed-in tariffs per small hydro (as well as for PV, wave energy, small hydro, wind power, forest biomass, urban waste and biogas), investment subsidies and tax reductions. A participatory approach is being explored in the construction process of the hydro plants of Sabor, Tua and Fridao whose regions have strong similarities: limited offer of medical, social and tourism services, lack of infrastructures; high unemployment, low education rate and an ageing population .

Type of benefit sharing mechanism: Benefits in kind

Renewable energy source: Hydropower

Application of BSM

Benefits in kind: In order to increase the community acceptance to the hydro projects, EDP has conducted studies on community expectations and their risk perception and has set up a well-structured consultative process to facilitate social participation. These procedures have permitted to establish strong local relations and partnerships through strong communication channels. This process demonstrated that the citizens' main expectations from the project focussed mostly on generating opportunies for economic development such as local employment, tourism, road access and the possibility for reduced energy prices. In line with these expectations, the EDP Foundation has started to implement programs such as social support for retired population, educational and cultural programs for young people.

Factors which contributed to the success of the project

Elaboration of a 'Community involvement plan' by EDP which included assessment measures and the measurement programs

Involvement of the local authorities from the very start of the construction process .

Emphasis has been placed on identifying the correct stakeholders and on allowing their involvement during all project phases.

Roles of the different stakeholders

EDP is the engine of the process and has covered the additional costs in respect to the compliance with the basic legal compensation measures and is addressing the citizens' expectations through the EDP Foundation. Major efforts have been placed on overcoming the ‘ lack of participation’ culture and local authorities and citizens have responded positively to the consultative procedures and to the EDP Foundation programmes.

Difficulties which had to be overcome

Lack of participation culture from Portuguese society: The historical record of hydro-power plants built in the fifties and sixties did take local communities and stakeholders involvement and participation into consideration.

Weighing the community expectations in order to avoid possible disappointment and/or the feeling of limited intervention power.

The community of Amarante opposes the construction of downstream dam in Fridão as the water level in the Tâmega river would rise in the city. They argue that a higher water level poses an increased threat of floods in the city. They also fear that higher water levels would destroy the banks of the river, affecting the view of the city and removing the ability to enjoy walks along the river and instead replacing it by polluting and noisy entertainment such as jet-skis.

Impact of BSM of this project on community acceptance

As it is an ongoing process is too early to evaluate its long term impacts on acceptance of the new hydro plants.

Planned production of MW by your project: Sabor: 171 MW,
Tua: 251 MW,
Fridao: 238 MW,

Website: http://www.a-nossa-energia.edp.pt

PV Soundless

Name of the project	PV Soundless
Country	Germany
Description	In 2001 a grid-connected photovoltaic sound barrier was constructed at Freising. At the time of construction this PV sound barrier was the highest yielding sound barrier of the world with a total capacity of 718 kW.
Project developer	Utility Freising, Gehrlicher Solar, Consultant M. Grottke
Start date	23-12-2002
Total investment (€)	3,6 million
Financing sources	Shareholder Equity (Utility Freising, Local Private Investors) National public financing for sound barrier European Commission Co-Financing (minor part of PV system) Debt financing
Initiator	Utility Freising, Gehrlicher Solar, Isofoton, Consultant M. Grottke
Investor(s)	Utility Freising and private investors of the region
Project owner	Utility Freising and private investors of the region
Actors receive benefits	Utility Freising and private investors of the region & surrounding residents

Background information: Highway traffic increase and a parallel grow of the municipality of Freising required the construction of a noise barrier between the highway and the newly created industrial real estate area of the municipality. At the same time the citizens of Freising are very active in the clean electricity sector. The concept of combining a sound barrier with a PV system seemed an ideal manner to combine two public goods.

Type of benefit sharing mechanism: Local ownership/co-ownership
Benefits in kind

Renewable energy source: Solar energy

Application of BSM: Local ownership: in the first two subsystems of the PV installation local citizens were offered the possibility of purchasing shares in the project.

Benefits in kind: combining the public good of a sound barrier with the generation of solar energy.

Roles of the different stakeholders

Local politicians (strong green party) are pushing the municipality of Freising to reach 100% clean electricity generation within medium-term

The municipality of Freising is the 100% owner of the utility Freising which installed the system

The municipality of Freising via its utility has direct links to other relevant stakeholders, such as the organisation in charge of highway maintenance

Factors which contributed to the success of the project

Political Support: the municipality of Freising is actively involved in promoting renewable energy and has large ambitions in this field. Gathering the required permits for a noise barrier and PV system requires the collaboration of several public actors such as the utility, the organisation in charge of highway maintenance and the municipality. As the municipality was the initiator this greatly speeded the process of realising the project.

Impact of BSM of this project on community acceptance

The project demonstrates on a larger scale the possibilities of integrating renewable energy solutions in other public goods such as sound barriers which have a high rate of public acceptance.

Impact of BSM of this project on socio-political level or market acceptance

Market Acceptance: in Germany this project is used as an example for other PV noise barriers. The constructer actively promotes this product.

Planned production of MW by your project 718 kW

Solar Park Rothenburg

Name of the project	Solar Park Rothenburg
Country	Germany
Description	A grid-connected 20,6 MW PV system was installed on the former airport area. It is one of the largest solar photovoltaic systems installed in Germany and has a surface of approximately 68 ha (the area required is around 2,9 ha per MW). The expected annual yield should exceed 20 GWh. Project development, project financing and project installation was realised by Gehrlicher Solar AG.
Project developer	Gehrlicher Solar AG
Start date	14-04-2009
Total investment (€)	60 million
Financing sources	Private capital of Gehrlicher Solar AG, private capital of the utility Munich (Stadtwerke München GmbH) and co-financing via banks.
Initiator	Gehrlicher Solar AG
Investor(s)	Gehrlicher Solar AG, private investor, Stadtwerke München GmbH
Project owner	Gehrlicher Solar AG, private investor, Stadtwerke München GmbH
Actors receive benefits	The assiciation of communities Rothenburg Görlitz, local Airport
Legal background	In Germany the local network operators must pay for grid extension measures. These costs are then forwarded to the clients via network charges. For the investor the installation area must be classified as a 100% conversion area. Otherwise the feed-in tariff might not be paid after the system is operational.

Type of benefit sharing mechanism	Benefits in kind Local contracting Local employment Indirect social benefits
Renewable energy source	Solar energy

Application of BSM

Benefits in kind: the local airport was threatened with closure. As the PV park was built on land of the airpot it makes periodic payments for land use which together with business taxes allow the airport to remain operational.

Local Contracting: During the construction phase of the PV park local contractors were employed for the instalment which are now employed for its maintenance.

Local employment: the PV park created new jobs for operation and maintenance which are shared with the airport

Indirect Social Benefits: as the airport can remain open thanks to the PV park, many existing jobs were preserved.

Factors which contributed to the success of the project

Legislative factors played an important role, as the airport was designated a 'conversion' area leading to higher revenues to the local authorities and allowing the local airport to remain open. Political support also played a large role as the head of the district authority was the previous mayor of Rothenburg. He was aware of the financial problems the town was facing and significantly supported the project to secure funds to allow the airport to remain functional.

Roles of the different stakeholders

Head of district authority: as previous mayor of Rothenburg he provided a great level of support for the project, and helped work away bottlenecks.

Difficulties which had to be overcome

The local network operator was hesitant to make the grid connection with the PV park. The costs for the grid extension would have to be forwarded to its clients, and the higher the share of fluctuating renewables, the higher the charges which have to be asked from its clients. Also the area developed must be designated a 100% 'conversion' area to receive the correct feed-in tariff. The designation is often uncertain however, which creates difficulties for the developers during the planning phase.

Impact of BSM of this project on community acceptance

The fact that the construction of the PV park used local contractors, created local jobs and preserved old jobs in the airport helped create a broad level of community acceptance.

Planned production of MW by your project 20 MW

Surano Nursery School

Name of the project	Surano Nursery School
Country	Italy
Description	The projects entails a photovoltaic system with a capacity of 819 kWp. The panels used are Suntech model stp230/20wd and have a capacity of 230 watt. The support structures are made of galvanized steel embedded in the ground directly without the use of foundations.
Project developer	Energia Progettazione Sviluppo Srl
Start date	22-08-2008
Total investment (€)	2'800'000
Financing sources	Private capital of Energia Sviluppo Sud Due Srl and co-financing from Gestore dei Servizi Energetici - GSE S.p.A. (GSE) via banks. GSE plays a central role in promotion, support and development of renewable energy sources in Italy. GSE's sole shareholder is the Italian Ministry of Economy and Finance which, in consultation with the Ministry of Economic Development, provides guidance on GSE's activities.
Initiator	Energia Progettazione Sviluppo Srl
Investor(s)	Energia Sviluppo Sud Due Srl
Project owner	Energia Sviluppo Sud Due Srl
Actors receive benefits	Local community, Enel SpA, Energia Sviluppo Sud Due Srl, Energia Progettazione Sviluppo Srl
Legal background	The Puglia region has a local law that facilitates the approval and construction of photovoltaic systems and lines of connection to the national grid. These simplified rules combined with large solar radiation typical of southern Italy making the plant very productive and convenient to be built.
Background information	The 'initiator' company (Energia Progettazione Sviluppo Srl) is based in Perugia (a city located in middle-south part of Italy), which is pretty close to Puglia and that has enabled developers to monitor projects in a very careful way.

Type of benefit sharing mechanism	Benefits in kind Local contracting Local employment Indirect social benefits
Renewable energy source	Solar energy

Application of BSM	Benefits in kind: the area where the plant has been built - about 3 hectares - was abandoned and no longer used for agriculture during the last 20 yeas. So the land dried up due to prolonged carelessness showing a predominance of limestone outcrops. Thanks to the PV plant construction the area has been reclaimed and an electric cabin for public use has been built allowing access to the site and then promoting the development of new industrial activities. Secondly, since technical rooms are prefabricated and internal streets are made of clay and gravel a minimum environmental impact has been guaranteed together with an easy restoring of the site at the end of production cycle.

Local contracting: to build the photovoltaic plant temporary employment has been used.

Local employment: once the plant started to be operative a stable opportunity of work for local people is guaranteed for the maintenance of the land and the photovoltaic plant as well as for surveillance of the area .

Indirect social benefits: the land on which the photovoltaic system has been installed is owned by a charity organisation that can then relies on a direct benefit from the rent allowing the survival of both a hospice for elderly people and a nursery school.

Factors which contributed to the success of the project

Legislative simplification of Puglia region regarding the installation of photovoltaic panels has been the guideline for the Italian national legislation. Moreover, the support from political side together with the local community involvement has been crucial.

Difficulties which had to be overcome

This type of plants are very well accepted in industrialized areas but hardly common in tourist areas.

Planned production of MW by your project 1'100 MW per year

Website www.energiasviluppo.it

Barba (Lecce) PV power plant

Name of the project	Barba (Lecce) PV power plant
Country	Italy
Description	This project entails a photovoltaic plant of 999 Kwp power, which has been built on a marginal land of 3 hectares that was not used for agriculture for more than 20 years. Each crystalline silicon module is Suntech model stp230/20wd with a power of 225 watt and it is anchored to a steel support directly driven in the land without cement foundations.
Project developer	Energia Progettazione Sviluppo Srl
Start date	20-03-2008
Total investment	(€)2'800'000
Financing sources	Private capital of Solare Delta and co-financing from Gestore dei Servizi Energetici - GSE S.p.A. (GSE) via banks. GSE plays a central role in promotion, support and development of renewable energy sources in Italy. GSE's sole shareholder is the Italian Ministry of Economy and Finance which, in consultation with the Ministry of Economic Development, provides guidance on GSE's activities.
Initiator	Energia Progettazione Sviluppo Srl
Investor(s)	Solare Delta Srl
Project owner	Solare Delta Srl
Actor receive benefits	Local community, Enel SpA, Solare Delta Srl, Energia Progettazione Sviluppo Srl
Legal background	The Puglia region has a local law that facilitates the approval and construction of photovoltaic systems and lines of connection to the national grid. These simplified rules combined with large solar radiation typical of southern Italy making the plant to result very productive and convenient to be built.
Background information	The 'initiator' company (Energia Progettazione Sviluppo Srl) is based in Perugia (a city located in middle-south part of Italy), which is pretty close to Puglia and that enabled developers to monitor projects in a very careful way.
Type of benefit sharing mechanism	Benefits in kind Local contracting Local employment Indirect social benefits
Renewable energy source	Solar energy
Application of BSM	Benefits in kind: due to carelessness this land had dried up showing many emerging rocks and thus it was considered unusable for modern agriculture. Moreover plenty of rubbish was present on the land. Thanks to the PV plant construction an old street has been brought back into use to access the site allowing fruition by everyone of an area of more than 200 hectares of which nowadays 30% is cultivated while another 30% has been destined to the PV power plant. Secondly, since technical rooms are prefabricated and internal streets are made of clay and gravel a minimum environmental impact has been guaranteed together with an easy restoring of the site at the end of production cycle. Local contracting: to build the photovoltaic plant temporary employment has been used to a mean of 15 local people for a period of three months.

Local employment: once the plant started to be operative a stable opportunity of work for 4 people has been guaranteed for the maintenance of the land and the photovoltaic plant as well as for the area surveillance.

Indirect social benefits: thanks to restoration of viability some typical agricultural buildings became available to everyone and that has increased the local tourism. Moreover, many people are used to come in this area for biking and playing battles with soft air weapons.

Factors which contributed to the success of the project

Legislative simplification of Puglia region regarding the installation of photovoltaic panels has been the guideline for the Italian national legislation. Moreover, the support from political side together with the local community involvement has been crucial.

Difficulties which had to be overcome

This type of plants are very well accepted in industrialized areas and hardly accepted in tourist areas.

Planned production of MW by your project 1'340 MW per year

Website www.energiasviluppo.it

Annex 4. Literature Review

Literature Study Prepared by RebelGroup in cooperation with COWI & ISIS

Rebel Group Advisory bv
Wijnhaven 3-o
3011 WG Rotterdam

www.rebelgroup.com

Jan Coen van Elburg (Project Leader)

jancoen.vanelburg@rebelgroup.com

Renaat Jansen

renaat.jansen@rebelgroup.com

Elisabeth Schuurmans

elisabeth.schuurmans@rebelgroup.com

COWI A/S
Prallelvej 2
DK – 2800 Kongens Lyngby

www.cowi.com

Anders Richelsen

ARI@cowi.dk

Istituto di Studi per l'Integrazione dei Sistemi
Via Flaminia 21
00196 Rome – Italy

www.isis-it.com

Michela Fioretto

mfioretto@isis-it.com

Contents

1. Introduction

Due to a renewed focus on the environment and climate change, renewable energy has claimed an important position on energy policy agendas of governments worldwide. Policy makers have set themselves ambitious targets for increasing the share of renewables in the energy mix and implemented various support mechanisms to achieve the agreed targets. Growth in renewable energy projects (REP) has however largely remained below expectations. Governments and developers are often faced with paradoxical public opinion towards new projects: On the one hand studies demonstrate broad public support for renewable energy in most European countries (Krohn & Damborg, 1999); while on the other hand developers experience fierce local resistance in realising their project.

The goal of this paper is to identify mechanisms through which benefits generated by REP can be shared with local host communities. The basis of this study is comprised mostly of academic papers and case studies covering the rationale behind public attitudes and the use of benefit sharing mechanisms to increase the acceptance of REP. The overview of the existing works will help identify and categorize the various mechanisms and their applicability for future projects.

2. Introducing the concept of Benefit-Sharing

The concept of benefit-sharing is based on the acknowledgement that the siting of large facilities -such as energy infrastructure- can have undesired negative impacts on the host community. Although large developments benefit several stakeholders directly and indirectly, usually well beyond the host community, the burdens are mostly borne by local stakeholders leading to local resistance against the siting decision. A common reason behind this negative public attitude by local stakeholders is the uneven allocation of benefits and burdens amongst stakeholders (Grin & Van de Graaf, 1996). To overcome such allocation issues, benefit sharing is cited as a possible solution to siting issues and used to convince the local host community that "*they are better off having the facility than maintaining the status quo*" (Jenkins-Smith & Kunreuther, 2001).

Benefit-sharing mechanisms are a means to transfer benefits to the local communities affected by the development, and in turn improve social acceptance. The exact definition of the local community varies in the consulted literature. Often, it is described as the residents of an area surrounding a development who experience any direct impact to their environment. The term 'impact' is employed to describe any effects, both positive and negative, on environmental, social, economic (such as property values, service prices), spatial, nuisance (such as aesthetics or noise), or health related aspects. In other studies, a broader definition is given and the term 'local community' is perceived to include any stakeholders affected by the development. Under this definition, non-residents such as holidaymakers with a second residence or enterprises depending on resources affected by the development are perceived as members of the local community . As this paper aims at assessing the performance of benefit-sharing mechanisms both in allocating benefits as well as generating social acceptance, the latter definition of the local community will be used. A comprehensive inclusion of all affected stakeholders will aid in our impact assessment.

An additional point in defining the concept of benefit-sharing, concerns the distinction between compensation and the sharing of benefits. *Compensation* should be defined as any necessary costs made by the developer to correct effects of the development on the 'quantifiable' local amenities already enjoyed by the local community. These include but are not limited to: displacement of the local populace, relocation of electricity and television cables and compensation for possible damages due to the development (see also Box 1). *Benefit-sharing* on the other hand, encompasses mechanisms which allow the hosting community to participate in the benefits generated by the development. Benefit sharing mechanisms should thus represent an added value for the affected local stakeholders, rather than restoring the 'status quo ante'. Compensation and benefit sharing mechanisms also differ in financial terms (Van Binh, 2009). Compensation measures are often short-term measures, usually undertaken during the construction period of the facility; hence financed by the investment budget. Benefit-sharing mechanisms on the other hand are usually long-term measures financed by the operating income of the project.

Box 1: Potential negative impacts on the local community by energy projects.

A wide range of negative impacts on the local community can be discerned, depending on the type of facility. Slovic et al. (1991) name increased pollution, noxious odours, increased mortality and morbidity, loss of wildlife habitat, excess anxiety, increased traffic, drops in local property values, losses to the local visitor economy and stigmatisation as possible negative impacts. Gregory et al. (1991) however simply classify negative impacts into four broad categories: economic losses, impacts to human health, decrements to quality of life and degradation of the physical environment.

Quantifying the necessary level of benefits however, is not an easy task. Theoretically, using a two-period utility model, the benefits gained by the local host community in the second period should at least offset any losses of utility compared to the period before the development. When the utility remains identical for the community before and after the development they should be indifferent to hosting the facility (Kunreuther & Easterling, Are risk-benefit tradeoffs possible in siting hazardous facilities?, 1990). The quantification of the required benefit is however difficult and limited by other aspects as explained further in the paper.

3. Benefit-Sharing Mechanisms in Other Sectors

Benefit-sharing has been used in other sectors than renewable energy. Potentially hazardous facilities, such as (nuclear) waste disposals or prisons, are prime examples of developments which provide benefits to several stakeholders with negative impacts to the hosting communities. Siting of these facilities has proven to be challenging for several decades and benefit-sharing mechanisms have routinely been applied. Consequently, an extensive amount of literature on the subject is available.

As a first step in identifying benefit-sharing mechanisms for REP, we will focus briefly on the insights gained from these studies to understand under which conditions benefit-sharing aids the siting of REP.

3.1 Responses to Benefit-Sharing Mechanisms

Benefit-sharing has been used successfully to site unwanted hazardous facilities in the past. In a study by Kunreuther et al. (1996) the example of a solid waste landfill in Virginia is cited. In this case the developer was able to build local support for the landfill by offering the hosting community a package of benefits: a 'tipping fee' is provided to the city which allows a reduction of taxes and is spent on rebuilding schools coupled with a free garbage collection service for the community.

The same study also notes that, when the local community accepts benefits in exchange for the development it can provoke severe negative reactions beyond the local host community. The city of Bergkamen in Germany for example, hosted a power plant in exchange for monetary compensation. The fact the community received monetary compensation was poorly received by the German press as, according to them, this would provide incentives for groups to protest against any future facilities under the expectations of ultimately being 'bribed' by the developer (Kunreuther & Linnerooth, 1983). A second example is a case in Lin Yua, Taiwan, where, after a wastewater overflow affected local water supplies, villagers forced the petrochemical firms responsible to close in 1988. In exchange for a substantial monetary compensation however, the villagers were willing to accept the reopening of the facilities. This was also met by fierce resistance throughout the country as this reaction was considered inappropriate and morally unacceptable.

Other studies conducted surveys to examine the response to several types of benefit-sharing mechanisms in exchange for siting hazardous facilities nearby. Bacot et al. (1994) examined responses to the siting of a municipal landfill facility. Respondents were first asked to indicate whether or not they would accept such a siting, without mentioning possible benefits. Following their initial response, the possibility of economical benefits was introduced in the following forms: rebates on property taxes, state money for schools, or state money for road improvements. The study demonstrated that introducing any economic benefits practically doubled the level of acceptance by the local host community.

A study by Jenkins-Smith et al. (2001) used a survey to measure the impact of benefit-sharing on the acceptance of siting a prison, a landfill, a waste incinerator or a nuclear waste deposit by nearby communities. The first part of the survey measured the public's initial acceptance to the siting. The respondents were asked to evaluate for each facility: (1) its risk to the health and safety of those living nearby; (2) the necessity of the facility being built, and (3) the degree of public trust in the officials responsible for the management and oversight of the facility. They concluded that the perception of these three aspects determined the acceptability of each facility. As a following step, respondents were asked to provide their opinion about the appropriateness of eight different types of benefits in exchange for the siting of the facility: (i) grants to local government; (ii) free garbage pickup; (iii) tax rebates; (iv) compensation for property value loss; (v) reimbursement for new public services; (vi) paying medical costs for health effects from the facility; (vii) trust fund for harm to future generations, and (viii) special services to meet community needs. The study shows that individual benefits such as tax rebates, garbage pick-up, or even payments to the local government are seen as the least acceptable. Benefits which relate to an equitable distribution of the effects, such as community services or compensating people for lost property values, were deemed the most acceptable. A notable exception was that a free garbage pick-up was found significantly more acceptable when hosting a landfill. This might suggest that linking the type of compensation to the characteristics of the facility may be relevant to gaining acceptance.

Both the study of Kunreuther et al. (1996) and Jenkins-Smith et al. (2001) find a low acceptance for siting a nuclear waste deposit. The introduction of benefits did not greatly affect the level of acceptance in this case. A cited study (Dunlap & Baxter, 1988) found that offering payments actually lowered acceptance of such a facility. A possible explanation for this phenomenon was provided by Kunreuther et al. (1996) and stated that compensation is more likely to be rejected when a proposed facility is considered unethical or immoral. Providing benefits in these cases is perceived as a bribe; rather than an actual benefit.

3.2 Non-Monetary Benefits

Besides strictly monetary benefits, non-monetary compensation can also be considered in cases of potentially hazardous facilities. Gregory et al. (1991) identify five categories of non-monetary compensation:

- In Kind Awards: are measures linked to offset the impact generated by the facility. When for example a facility is expected to have a negative impact on the residents' health, benefits in the form of improved or free medical services can be considered.
- Contingency Fund: can be considered a form of insurance to the community. With this fund the developer will cover any losses related to accidents or damages which affect residents e.g. costs for fixing the roofs of residents which live near an airport runway.
- Property Value Guarantee: these measures compensate residents for a decline in property values and are usually based on benchmark values of the surrounding unaffected communities.
- Benefit Assurances: are meant to raise the standard of living in the host community by guaranteeing direct or indirect employment for its members.
- Economic Goodwill Incentives: are funds spent on community projects such as schools or parks. These are done on an ongoing basis to maintain a positive presence within the community.

Other studies suggest that non-monetary benefits might actually be preferred by community residents when dealing with perceived high-risk facilities. Portney (1991) performed a survey in Massachusetts, USA, regarding their attitudes to hosting a hazardous waste treatment plant. To convince opponents, both monetary and non-monetary benefits were offered. The non-monetary measures -including college scholarships and property value guarantees- proved to have a more positive impact on attitudes compared to monetary measures. These also corroborate the findings by Jenkins-Smith et al. (2001) mentioned above.

Mansfield et al. (2002) conducted a study concerning the effects of cash benefits compared to public goods on the attitudes of local residents. Based on a review of existing literature, the study identifies two negative psychological reactions to monetary compensation. First, cash payments can carry the stigma of a bribe in exchange for principles (see also Bergkammen power plant case presented above). Second, monetary benefits may diminish civic duty towards the community and cause a crowding out effect on the motivation for supporting the facility. Public goods on the other hand are expected to counteract the negative feelings caused by cash benefits. They are often not perceived as a bribe and people might find it easier to think in terms of a trade-off between the public harm of the facility and the benefits of public goods.

Empirical evidence that supports these findings is provided by Mansfield et al. (2002). They surveyed the siting of a moderately undesirable, albeit not unhealthy or dangerous, facility such as a noisy road, an airport or a livestock farm close to the respondent's property. They concluded that over a variety of public goods and harms, respondents consider public goods more valuable in the presence of public harms. The study also found a positive bias towards public goods when respondents are offered a neutral choice between cash and public goods.

3.3 Benefit-Sharing Mechanisms in Other Sectors: Conclusion

The studies above demonstrate that benefit-sharing mechanisms can play an important role siting potentially hazardous facilities. More specifically, the studies demonstrated that the residents' acceptance rate for siting potentially hazardous facilities nearby, increased significantly when benefits were offered. On the other hand, certain cases demonstrated that accepting potentially hazardous facilities in exchange for benefits can be perceived as immoral or a bribe and deteriorate social acceptance in return. The general level of acceptance however depended on the perceived risks towards the community. When perceived risks are high, such as for siting nuclear waste facilities, several studies demonstrated that benefit-sharing mechanisms did not have a significant impact.

A concluding remark from these studies is that non-monetary benefits might be more suitable compared to monetary benefits. Cash benefits such as individual payments or tax rebates can be perceived as an inequitable distribution of the benefits amongst the local community. Studies suggest that the public character of the harm makes it easier to link them to public goods. In line with this, the perception exists that non monetary benefits are better suited to mitigate risks associated with the facility e.g. fire hazard asks for fire insurance.

It is noteworthy to repeat that the facilities described by the cases above, represent a clear potential risk towards the hosting local community. These benefit-sharing mechanisms are not always strictly transferrable towards REP as they generally do not pose a health risk but represent other issues for the hosting community. Nevertheless the cases presented provide valuable insights into public attitude towards undesirable developments and appropriate benefits. In the following section we focus on renewable energy and the available literature dealing specifically with public attitudes.

4. Benefit-Sharing Mechanisms in Renewable Energy Projects

Several studies cite a broad international support for renewable energies under the public (Hasselmann, et al., 2003) (Jäger-Waldau & Ossenbrink, 2004). Yet creating local acceptance for siting renewable energy projects is proving to be a challenge for policy makers and developers alike. This is usually due to the inherent characteristics of REP. In this section we first analyse the main hurdles in siting REP. Second, a classification of suitable benefit-sharing mechanisms and their usage will be presented. Third, we will conclude with a presentation of community based initiatives.

4.1 Renewable Energy Projects' Siting Issues

Siting renewable energy projects (REP) has proven difficult due to several reasons (Wüstenhagen, Wolsink, & Bürer, 2007). First, REP are typically smaller in scale compared to traditional fossil-fuelled power plants; a fact which significantly increases the number of siting decisions to be taken. Second, the energy output of these REP is typically lower when compared to traditional fossil-fuelled energy plants increasing the 'visual impact per MWh of output'. Third, as externalities of the different technologies are not taken into account, REP and fossil-fuelled energy plants are not compared by the general public on the same basis. Differences in the price of the energy output are a prime example of this. Fossil fuelled energy plants provide energy at lower market prices than REP. External costs (or negative externalities) such as pollution or environmental degradation in general are insufficiently included in the market price leading to an incorrect basis for comparison of the different energy sources by the general public. The acceptance of renewable energy is often a choice between short-term costs and long-term benefits.

Kahn (2000) also studied the reasons for resistance to siting renewable energy. He concluded that the problems from siting renewable energy projects stem from the fact that the resources usually determine the site. In contrast with fossil-fuelled energy plants, which are often sited in industrial areas, REP often need to be sited in rural zones. As residents of these areas are unaccustomed to such developments and derive a 'sense of identity' from the landscape the level of resistance is usually higher. An additional complication with siting REP in rural zones is often the lack of proximity to the required infrastructure such as sewage and transmission lines. The construction of this infrastructure increases the visual impact of the development on the residents. Considering that rural areas often also depend on tourism for income, visual impacts are of high concern to local communities.

Three different types of motivation against REP were identified by Kahn (2000): a 'Not in my Backyard' (NIMBY) response, environmental values, and opportunism. Resistance from a NIMBY perspective stems from a feeling of 'parochialism' and 'reactionism' to preserving one's surroundings. Environmental values as a reason for opposing renewable energy seems rather paradoxical, but several developments have been resisted when they are perceived to threaten species or to pollute a pristine landscape. While these first two categories of opponents wish the project to fail, members of the community which oppose the development out of opportunism wish it to succeed as long as the sponsor pays a price. Opportunistic opposition however, is difficult to expose.

Social acceptance of renewable energy is therefore an important aspect in successfully realising new projects. Wüstenhagen et al. (2007) provide a three dimensional model which helps conceptualise social acceptance of renewable energy. The first dimension, socio-political acceptance, is considered the broadest level and measures general public acceptance for technologies and effective policies regarding renewable energy. The second dimension, community acceptance, relates mainly to acceptance by the local stakeholders to the siting decisions. Especially the perception of fairness and an equitable distribution of the costs and benefits are important in generating acceptance in this dimension. Finally market acceptance relates to the process of market adoption of new technologies and green electricity. The study finally makes note that typically renewable energy is accepted within one dimension but not within the other e.g. the Netherlands where there is a large demand for green electricity (market acceptance) but insufficient community acceptance to build the required facilities. These three dimensions help in identifying the source of resistance to new developments.

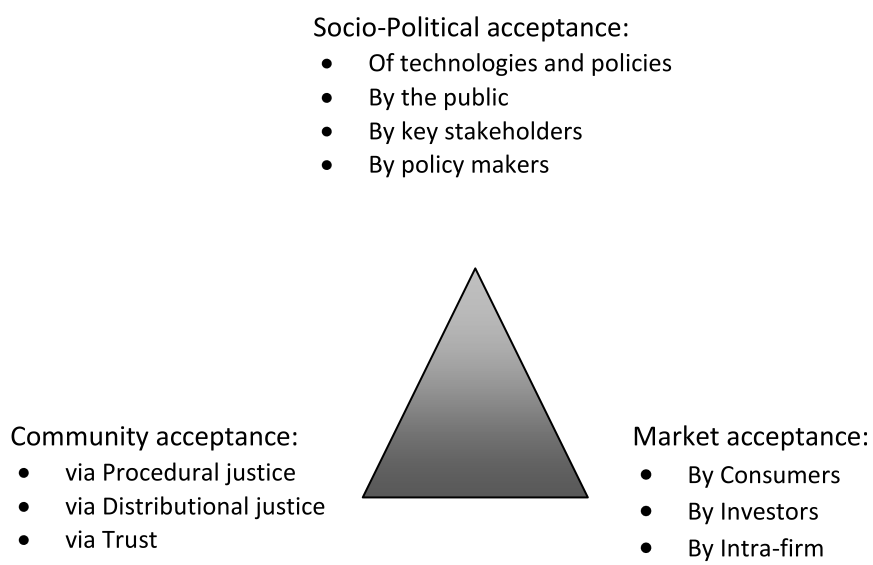


Figure 3: Social Acceptance Levels (Wüstenhagen et al

4.2 Classification of Renewable Energy Benefit-Sharing Mechanisms

Literature on renewable energy usually does not focus on the mechanisms itself but rather on case studies where a certain mechanism was used. The focus often lies on community ownership. There are nevertheless some 'toolkits' available, usually from renewable energy organisations, which describe certain mechanisms to deliver benefits to the hosting communities.

One of the more extensive toolkits for wind power, written for the Renewables Advisory Board (Garrad Hassan & Partners Ltd, Peter Capener & Bond Pearce LLP, 2009) in the UK, provides a starting point for describing and categorising benefit-sharing mechanisms. The toolkit identifies four mechanisms: (1) community funds, (2) benefits in kind, (3) local ownership and (4) local contracting.

(1) Community funds are funded with payments from the developer and are used within the community itself. The payments can take various forms such as a lump sum at project initiation, or can be linked to the project revenue. The developer however needs to assess the risk of the payment mechanism compared to the acceptance it will create within the community. Linking payments to the project's success limits the risk for the developer; it might on the other hand increase resistance to the project if no payment is received during a less profitable period. Other issues concerning community funds concern the determining which communities should benefit and the goal of the fund as this can cause dissention and ultimately increase resistance.

(2) Benefits-in-kind are defined as local improvements for the community delivered directly as part of the construction process. These are usually cheaper for the developer as they can be undertaken by the appointed contractors. Examples of benefits-in-kind include tourism & recreational facilities, amenity improvements or environmental improvements. Possible issues with benefits-in-kind depend greatly on the improvement delivered. The improvement might require maintenance, which the developer nor the community might not be willing to pay, or be of limited benefit to several members of the community.

(3) Local ownership of the REP allows individuals or groups to participate in the project and share the profits. This often creates the strongest link between the community and the project. Ownership can either be granted by the developer to the community, or be purchased by individuals. Individual ownership shares can however be costly and thus unavailable to all members of the community creating divisions within its members.

Local contracting (4) involves engaging local contractors in the construction of the wind farm and thus creating local employment. Granting guarantees for local employment however is not always possible within governing laws.

Rogers et al. (2008) do not identify the mechanisms themselves but rather categorise the possible benefits derived from renewable energy projects into three dimensions: social, economical and environmental. Social benefits relate to intangible benefits which accrue to the community such as education, or a feeling of a positive contribution to society. Economic benefits to the community are usually quantifiable such as employment opportunities, grants, or cheaper electricity. Last but not least, environmental benefits usually accrue to a larger number of stakeholders but can also benefit the local environment. A considerable overlap between these dimensions is possible as for example, local employment can be considered an economical as well as a social benefit to the community.

From the available literature and the case studies, we have distinguished the following benefit-sharing mechanisms:

1. Community Funds: the local developer provides funds which are at the disposal of the community for common projects, either directly into a community fund or indirectly through paying taxes for developing public grounds.

- Advantages:
  - Clear and tangible benefit in return for accepting the development
- Disadvantages:
  - Funding mechanism for the fund (depending on profitability) can create either resistance to the project when return period is too long or risks to the profitability of the project when no link exists to the project's profits
  - Allocation issues may arise since specification of which community (members of the community?) should receive the funds relies on RES project owner and can result in internal dissention and resistance within the community
  - When provision of funds is realized by the payment of taxes, the local community might feel that it does not control where the funds are spent on; since taxes are administered by the local authorities.

2. Local Ownership: the developer grants or offers shares of the development to the local community

- Advantages:
  - Creates local involvement and support
- Disadvantages:
  - If not granted but instead offered for sale, not all members might have the means to participate creating dissention within the community and resistance

3. Compensation: the developer compensates for possible damages such as ecological damages (e.g. by creating a new habitat for species endangered by the development)

- Advantages:
  - Creates a public good to compensate for a unquantifiable public harm
  - Well tailored mechanism for ecological damages
- Disadvantages:
  - Might only tackle the issues of a specific group within the community
  - Accountability and responsibility issues concerning long term costs associated with the compensation such as who is responsible for maintenance

4. Benefits-in-kind: the developer creates improvements to the community, usually during the construction phase

- Advantages:
  - Clear and tangible benefit in return for accepting the development
  - Creates a public good to compensate for a unquantifiable public harm
  - Might be cheaper for the developer to include during the construction process
  - Possibility to utilise local contractors, which in itself may increase local acceptance cf. below

- Disadvantages:
  - Benefits might be of limited use to several members of the community
  - Accountability and responsibility issues concerning long term costs associated with the benefits-in-kind such as who is responsible for maintenance

5. Local Employment/Contracting: local employment is created by the development and accrues to the local community

- Advantages:
  - Creates a broad level of support within the community, specifically in regions with high unemployment.
- Disadvantages:
  - Not always possible to guarantee employment limited to the local community within existing legislation.

6. Energy Price Reduction for the Local Community: local community consumes energy directly from the development at a lower price.

- Advantages:
  - A direct link between the benefit and the development is created which is generally easier to accept and can count on broad support
- Disadvantages:
  - Legislative barriers can limit this possibility (distinction producer / supplier) (e.g. competition laws or market deregulation directives)
  - Not always possible to receive energy directly from development; in some cases developer might have to use profits to buy energy from the market to deliver it to the community.

7. Indirect Social Benefits: any other benefit accruing to the community which is not directly quantifiable such as prestige, eco-tourism, knowledge etc.

- Advantages:
  - Create social cohesion
  - Typically cost-efficient for the developer
- Disadvantages:

- Applicability is very community dependent and might not be replicable over different projects

Table 1: SWOT analysis of expected impacts of benefit sharing mechanisms for renewable energy projects.

Benefit-Sharing Mechanism	Strengths	Weaknesses	Opportunities (Benefits)	Threats (Risks and/or potential negative impacts)
Community Funds		- Provision of funds depends on project profitability; that makes benefits uncertain - When provision of funds takes the form of taxes, the community might feel it does not control where the funds are spent on since they are administered by the local authorities	- Clear and tangible benefit in return for accepting the development	- Allocation issues since specification of which community should receive the funds relies on RES project owner
Local Ownership			- Creates local involvement and support	- If not granted but instead offered for sale, only shareholders might benefit creating dissention within the community and resistance
Compensation	- Creates a public good to compensate for a unquantifiable public harm - Well tailored mechanism for ecological damages	- Acccountability and responsibility issues concerning long term costs associated with the compensation such as who is responsible for maintenance		- Exclusive treatment: Might only tackle the issues of a specific group within the community
Benefits-in-kind	- Cheaper for the developer to	- Additional costs to be considered for	- Possibility to utilize	- Improvement projects or facilities

	implement since they can be undertaken by contractors - Improvement projects may benefit environmental quality at nearby areas of RES projects - Clear and tangible benefit in return for accepting the development - Creates a public good to compensate for a unquantifiable public harm	improvement projects (e.g. maintenance) - Type and scale of improvement projects depend on context and on willingness of project developers - Possible issues regarding long term costs associated with the benefits-in-kind such as who is responsible maintenance	local contractors	may yield exclusion of specific stakeholder groups that in turn result in acceptance deterioration
Local Employment / Contracting	- Direct contribution to local economy and development via provision of employment	- Compatibility with existing legislative frameworks needs to be assessed prior to provision of employment guarantees	- Contribution to local employment opportunities - Creates a broad level of support within the community, specifically in regions with high unemployment	
Energy Price Reduction for the Local Community		- Legislative barriers can limit this possibility (distinction producer / supplier) (e.g. competition laws or market deregulation directives) - Not always possible to receive energy	- A direct link between the benefit and the development is created that it is generally easier to accept and can count on broad support	

		directly from development; in some cases developer might have to use profits to buy energy from the market to deliver it to the community		
Indirect Social Benefits	- Creates social cohesion -Typically cost-efficient for the developer	- Replication possibilities might be limited as acceptance generated depends on the individual community		- Unpredictable - Applicability depends greatly on intangible factors such as existing predispositions and community values.
Note: **Strengths and Weaknesses**: Refer to context related issues that may ease or burden the siting of renewable energy projects. Context related issues concern institutional factors such as existing policies, regulations and environmental factors such as spatial issues, impacts on environmental resources and locale and nuisance or amenity issues (such as aesthetics or noise). **Opportunities and Strengths**: Refer to social issues; mainly social benefits and threats and social acceptance issues.				

4.3 Benefit-Sharing Mechanisms in Practice

Resistance levels depend greatly on the technology employed and the social context of a case study. In the following section we will analyse certain cases, per technology, described in the literature. We will use the social acceptance model described under 4.1 to determine the source of resistance and analyse which benefit-sharing mechanisms, described under 4.2 , were employed.

4.3.1 Hydro

Hydro Power is considered to be a valuable source of renewable energy by the EU, with some member states deriving considerable percentages of their electricity requirements from hydro power. Most large-scale dams in the EU are old and new projects involve only small-scale hydro power projects. There is however still a great potential in the sector for the refurbishment of existing installations and the addition of new ones as still a large percentage of favourable sites remain (SETIS European Comission). The development of large-scale hydroelectric dams usually affects multiple stakeholders leading to both low socio-political and community level acceptance within the EU, making benefit-sharing an important mechanism in creating social acceptance.

Van Binh (2009) states the example of the A Vuong Hydropower Project which is a pilot project for benefit-sharing mechanisms in Vietnam. Two communities affected by the dam participated in the pilot project. A fund was set up combined with a Benefit-Sharing Council (BSC) and a Fund Management Board (FMB). Besides compensation for displacement, community members could apply with the BSC to receive a onetime grant per household member depending on their exposure to the development. Additionally, a community fund was created for community projects such as creating fish farms and cage fisheries within the newly created reservoir. Van Binh (2009) also mentions other possible benefits to be shared from hydro developments such as access to water for nearby communities to be used for irrigation, protection against flooding and drought, and access to electricity for remote households.

4.3.2 Wind

Wind farms are arguably the development which generate the highest amount of opposition compared to other renewables. The high visibility of wind turbines coupled to the fact that usually 'scenic' (touristic) locations provide the best wind resources are the main reasons for opposition (Jobert, Laborgne, & Mimler, 2007). Another important reason is the possible health effects of living nearby wind turbines (related to noise, shadow flicker). There have therefore been numerous case studies of local resistance against wind farms and methods to tackle the resistance.

WINDFARMperception (van den Berg, Pedersen, Bouma, & Bakker, 2008), a study financed by the European Union, analysed the visual and acoustic impact of wind farms on Dutch residents. The study found that most respondents experienced the sound produced by wind farms as the most 'annoying' aspect of wind turbines. Respondents who received local ownership shares or other economic benefits from the wind farm reported significantly lower or no nuisance at all. A possible explanation is that these residents associated the sound of the wind turbines with their productiveness and thus increased benefits. Another factor mentioned is that these residents experienced having a measure of control over the wind turbines. The study showed no conclusive indication of health impacts from the sound of the wind turbines' operation. The level of nuisance experienced from the wind turbine was related to the sleeping difficulties, but it could not be ascertained whether "*the health effects are caused by nuisance or vice versa*".

Jobert et al. (2007) analyse French and German wind energy projects. In the case of France a very low socio-political acceptance for wind energy projects exists (see 4.1). According to a study by Nadaï (2007) states there are various reasons for this low socio-political acceptance in France ranging from "*a very centralized political culture to a technological and institutional lock-in into the nuclear industry*". Developers initially faced an uncertain legal environment and the government made use of poor, highly centralized, planning decisions not involving the local communities (Boston Consulting Group, 2004). This explains the presence of a strong anti-wind movement (Vent de Colère[6]) in France, which fears that wind farms could harm the landscape which in turn would affect the important income from tourism. In the case of the 'Camp Negro' wind farm in France the resistance was formulated principally from wine

[6] www.ventdecolere.org

growers and tourism representatives. They feared the region would receive an industrial image and remove the authenticity which attracts tourists. Community acceptance was created by creating indirect social benefits, mainly through eco-tourism by combining visits to the wine cellars with visits to the wind farm. A second case in France, in the Loire region, was initially met by local resistance because it was being developed in a bird-protection zone. Acceptance was created through benefits-in-kind, local ownership, local employment and indirect social benefits. The developer agreed to finance studies by the bird-protection association regarding the impact of the wind farm and allowing them to maintain an employee for the zone. The community was also offered the benefits of eco-tourism initiatives and owns three wind turbines.

Germany enjoys a strong socio-political acceptance for wind energy and REP in general. Besides economic policies to stimulate development such as feed-in tariffs, planning tools were also added. Local authorities in Germany can, for example, be forced to accept wind turbines on their territory. Jobert et al. (2007) discuss two German wind energy cases. The first in Rheinland-Pfalz, was to be constructed over an abandoned military zone. There were several benefits for the communities involved such as indirect social benefits, community funds and local ownership: First the wind farm would revalue the ground of the site consisting of mainly concrete floors and abandoned bunkers. As the farm was built on public land, the community received rent and tax money from the developer, and finally local inhabitants were offered the opportunity to buy shares. The second example of a wind farm, also in Rheinland-Pfalz, demonstrates however how the policies can be counterproductive to benefit-sharing. In this case the farm was built on private grounds accruing rent only to the owners of the grounds and not to the community as a whole. German policy which allows 'forced' developments led in this case to an inequitable sharing of the benefits.

The Navarre region in Spain, is one of the leading regions in renewable energy and the sector enjoys widespread support (Faulin, Lera, Pintor, & Garcia, 2006). The main reasons for lowering resistance were a host of economic benefits. First, measures were taken by the local authorities to ensure the affected communities were supported in the form of payments from wind farm developers. Second, indirect social benefits were created as a local awareness to the scarcity of energy resources existed. Third, there has been a significant creation of local employment both in the construction of facilities as well as setting up factories for capital goods such as aero generators and rotors. All these factors contributed to a wide spread acceptance by the local communities.

Denmark has played a pioneering role in wind energy and the technology enjoys broad social acceptance in all three dimensions mentioned by Wüstenhagen et al. (2007) (see 4.1). One characteristic aspect of the Danish wind-energy sector is local ownership through the cooperatives or guilds. Approximately 15% of Danish wind turbines are currently owned by these cooperatives or guilds. Especially wind turbines erected in the 1980s and early 1990s were and still are owned by these groups. Just before 2000, some 150,000 households were co-owners of a local wind turbine. Since then single-person ownership and large energy companies have played an increasingly important part in the establishment and ownership of wind turbines in Denmark.

New legislation from January 2009 aims to stimulate local involvement and ownership in new windenergy projects. The new Danish act on renewable energy imposes an obligation on all new wind energy projects to offer a minimum of 20% ownership to local inhabitants, e.g. cooperatives. The lessons learnt from many wind-energy projects in Denmark show that local involvement and local ownership facilitate dialogue and acceptance.

Local citizens' option to purchase wind turbine shares is stated in paragraph 13 of the act (Translations, 2009):

"Any person who erects one or more wind turbines of at least 25m in height onshore, or offshore wind turbines established without a tendering procedure, shall, prior to commencement of erection, offer for sale at least 20 per cent of the ownership shares to the persons who has permanent residence at a distance of no more than 4.5 km from the site of installation."

However some investors have experienced problems with this new legal requirement. The problem being that the stake is offered for sale before the project is fully implemented and investment cost are known. Moreover this can complicate the tender process, as investor has to interact with many stakeholders. Often the 20% stake is separated to a independent company/association typically as a partnership, which then has to be established.

4.3.3 Biomass

Biomass differs significantly from other renewable energy sources as it makes use of a combustion process. Biomass plants therefore require large amounts of fuel transportation which emit polluting gasses and is one of the main reasons for opposition to the technology (Hargreaves, 1996). Another difference, compared other renewable technologies, is that biomass plants emit water vapour and nitrogen oxides which causes visible smoke and in turn health concerns for residents (Löfstedt, 2002). A study of attitudes towards renewable energy in Sweden showed that biomass was considered the least 'clean' renewable energy source on a par level with nuclear power (Ek, 2005)

However it is due to the fact that biomass plants requires fuel, which can be transported to the site, that developers have a certain amount of flexibility regarding siting compared to other REP. Siting such plants in locations where residents are used to certain developments might not lead to any opposition at all. The example of Ambient Energy Ltd., a UK developer, demonstrates this. The developer submitted planning applications for two practically identical plants in the UK. One in Cricklade was rejected as local residents protested the impact the plant would have on the rural character of the environment. The other in Suffolk was accepted with little resistance as the community already hosted a chicken litter power plant and was accustomed to such developments (Upreti, 2004). Communities which are used to a certain development are less likely to resist a new comparable development.

The Elean Power Station in Ely, Cambridgeshire, one of the world's largest straw burning plants in operation, provides an interesting case (Upreti, 2004). The first planning application was rejected by nearby communities due to the following concerns: (1) pollution as the use of municipal waste was also proposed, (2) visual impact, (3) traffic pressure and (4) noise, environmental and landscape impacts. From a social acceptance point of view (see 4.1) the reasons for resistance were mainly on a community level (concerns over siting) and market level (concerns over technology and its pollution). The developer was willing to compromise to address these concerns and create acceptance. Although the direct economic benefits were present in the initial planning, as the straw was to be provided by local farmers, other benefits were added. Benefits-in-kind included the development of a 35 acre glasshouse development while environmental concerns were addressed by providing compensatory planting, keeping the first mile of power lines underground and providing the community with periodic reports of emissions. The community and developer currently enjoy a good relationship.

Another interesting example of benefit-sharing in biomass is the 'Bagasse Transfer Price Fund' (BTPF) used in Mauritius (Deepchand, 2002). The sugar industry is one of the main economic sectors on Mauritius. Producing sugar involves crushing large amounts of sugarcane which creates several tonnes of bagasse as a waste product. Sugarcane factories are self sufficient as burning bagasse provides sufficient energy to run the plant. However producers were always confronted by surplus bagasse which was initially considered a nuisance. The creation of a sole supplier of electricity on the island, the Central Electricity Board (CEB), created the opportunity to involve sugar factories as electricity providers to the net. This led to the development of dedicated bagasse burning plants which relied on the surrounding sugar factories to provide the fuel. At the start of the programme however, there was little socio-political and market acceptance for these policies. The price for bagasse and transport to the plants was considered insufficient by the sugar factories. Additionally the individual planters, which provided the sugarcane to the factories, felt they should also receive part of the benefits. To address these concerns the Mauritian government set up the BTPF. A price was determined for the sale of surplus bagasse to the power plants. The proceeds of these sales are placed in the BTPF and redistributed amongst the planters and millers based on the sugar production from their sugarcane. Additionally all employees and planters are granted 20% shares in the factories and power plants generating dividends. These policies of direct economic benefits created large social acceptance amongst all stakeholders.

4.3.4 Other Technologies

Solar energy appears to be a technology with a high level community acceptance level as we were unable to find any literature dedicated to cases of local resistance regarding this technology. This might be due to several reasons. First of all photovoltaic cells can be placed on almost any surface, such as rooftops, and are fairly unobtrusive. This means that they can be installed on existing infrastructure which in turn limits local resistance. Photovoltaic cells are also popular in several European countries, depending on the subsidies available, as a personal power source. The investment required is relatively limited making the technology fairly accessible to large portions of the population with the benefits accruing to the individual owners. Large photovoltaic plants have also mostly been erected in countries such as Germany and Spain where a high level of social acceptance for such developments exist. Solar thermal plants on the other hand are located in hot and sparsely populated territories such as deserts which also decreases the amount of resistance generated. Finally effects on the local ecology are limited compared to other renewable technologies. All these reasons offer possible explanations for the lack of literature regarding benefit-sharing in solar energy projects.

Waste incineration on the other hand, is a rather controversial source of renewable energy. The EU currently considers the portion of waste with a biogenic nature as a renewable energy source. Domestic waste however, does not consist only of biomass but contains other hazardous materials which release toxic gasses when incinerated. Although modern incineration plants contain several filtering and scrubbing systems and must adhere to strict emission standards, the siting of such facilities near residential areas can be met by strong local resistance. The Spittelau waste-to-energy plant in Vienna Austria provides an excellent example of how to create local acceptance for such a facility. After a fire in 1987 destroyed a large portion of plant, Spittelau was redesigned. The entire exterior was converted into a work of art and integrated into the city landscape, which currently attracts several tourists providing an indirect social benefit. The plant also provides district heating to 60.000 households in Vienna and several public buildings including the largest hospital in the city (Wien Energie, 2009) avoiding additional emissions for individual heating.

4.4 Community-Owned Projects

Community-owned projects are projects where the initiative and ownership of the project lies within the hosting community. Acceptance is usually high in these projects as the benefits accrue solely to the community, and no external parties are involved. Stimulating community-owned projects is seen by several governments as a means to 'revive' the rural economy by diversifying land use and thus achieving its renewable energy targets.

Walker (2008) identifies six incentives for community owned projects:

1) Community-owned REP provide local revenues, employment and energy
2) It is easier to achieve approval and planning permission as these projects are more likely to be acceptable to the community as a whole.
3) Local control: As these projects are managed by the community they will have more control over siting and scale decisions.
4) Lower energy costs and reliable supply for the community
5) Many community-owned initiators were driven by an environmental and ethical commitment. Such projects help instil these values within the communities and are important to public and private sector bodies with such policies.
6) There are several load issues with the electricity network caused by large renewable projects. If small scale projects closely match the existing load some of these issues could be avoided.

Scotland has supported these initiatives and provides financial support mechanisms for community energy projects from for example the National Lottery and the HIE[7]. Warren et al. (2010) examine in a

[7] Highlands & Islands Enterprise

case study the effect of local ownership on public attitudes towards the construction of a new wind farm in two Scottish communities: Kintyre and Gigha. Kintyre hosts a commercial project which is a significant employer in the community, while Gigha realised a locally owned wind farm. The survey initially tested local attitudes towards wind power and new developments in their communities. Both communities were positive towards wind power and new developments although Kintyre slightly less towards new developments. Support increased substantially in both communities when locally owned wind farms were proposed instead of commercial developments. The survey also showed a "strong sense of pride in, and connection with 'their' wind farm project" in Gigha which even went so far as to name their turbines. This contrasts with some feelings of alienation in Kintyre. The study strongly suggests that local ownership is indeed associated with positive attitudes.

Local policies however have a great impact on the viability of community initiatives. Denmark, a pioneer nation in the development of renewable energy and especially wind power, has a considerable experience with community initiatives (see also 4.3.2). The popularity of renewable energy in Denmark led to the formation of several wind cooperatives. The Danish government adopted policies to support this bottom-up approach coupled with economic support mechanisms such as feed-in tariffs to increase the viability of such projects. Initially in the 1980's the only criterion for ownership in a cooperative was a residence criterion in recognition that local people experience the visual and aural presence of turbines. This criterion however was gradually increased to include larger groups of stakeholders such as those living in neighbouring boroughs, those who own property in an affected borough but do not live there, all of Denmark and ultimately the entire European Union (Bollinger, 2001). The policy of allowing distant ownership has however weakened public support for wind in Denmark. Increasingly single farmers have larger stakes in new wind developments ultimately leading to the perception of "*large landlords getting financial support from public monies*" (Mendoça, Lacey, & Hvelplund, 2009).

4.5 Benefit-Sharing Mechanisms in Renewable Energy: Conclusion

The case studies from the available literature demonstrate how benefit sharing mechanisms can aid in creating acceptance and realising renewable energy projects. Social and technological factors however have a large influence in determining which benefit-sharing mechanisms are the most appropriate for a certain case. Involvement of the local community during the planning phase of renewable energy projects is however essential in reducing resistance and understanding which mechanisms are the most appropriate to be applied.

Wind and Biomass are the two technologies which seem to suffer the most from local resistance. The main reasons for opposing wind energy are the effects of turbines on the landscape, and perhaps indirectly tourism. Several case studies mention eco-tourism as an indirect social benefit which is used to counter this concern. While Biomass has a certain flexibility regarding siting decisions, proximity to fuel remains an important aspect. Most commonly benefits-in-kind are offered to rural communities where biomass plants are sited. An additional advantage biomass plants offe,r compared to wind energy, is local employment during the operations phase of the plant. A final common concern some people share in regard to both technologies are possible adverse health effects they might have on local residents. Although this concern was not an issue in the cases discussed above, insights from siting hazardous facilities could be applied to both technologies. Specifically in the form of a contingency fund which compensates community members for any damages suffered caused by the development.

The most popular mechanism, indifferent to the technology or country, appears to be local ownership as it creates a common interest between the local community and the developer of the project. This is also proven by the success of community owned projects as they create a sense pride and unity amongst the members of the community.

** Abbreviations Used*

REP Renewable Energy Projects

5. Bibliography

Bacot, H., Bowen, T., & Fitzgerald, M. (1994). Managing the Solid Waste Crisis: Exploring the Link between Citizen Attitudes, Policy Incentives and Siting Landfilles. *Policy Studies Journal 22(2)* , 229-244.

Bollinger, M. (2001). *Community Wind Power Ownership Schemes in Europe and their Relevance to the United States.* Laurence Berkely National Laboratory.

Boston Consulting Group. (2004). *Donner un nouveau souffle à l'éolien terrestre, développement de l'éolien terrestre en France.* Syndicat des énergies Renouvables.

Deepchand, M. (2002). Promoting Equity in Large-Scale Renewable Energy Development: The Case of Mauritius. *Energy Policy 30* , 1129-1142.

Dunlap, R., & Baxter, R. (1988). *Public Reaction to Siting a High-Level Nuclear Waste Repository at Hanford: A Survey of Local Area Residents.* Washington: Social and Economic Sciences Research Center, Washington State University, Pullman.

Ek, K. (2005). Public and Private Attitudes Towards ''Green'' Electricity: The Case of Swedish Wind Power. *Energy Policy 33* , 1677-1689.

Faulin, J., Lera, F., Pintor, J. M., & Garcia, J. (2006). The Outlook for Renewable Energy in Navarre: An Economic Profile. *Energy Policy 34* , 2201-2216.

Garrad Hassan & Partners Ltd, Peter Capener & Bond Pearce LLP. (2009). *Delivering Community Benefits from Wind Energy Development: A Toolkit.*

Gregory, R., Kunreuther, H., Easterling, D., & Richards, K. (1991). Incentive Policies to Site Hazardous Facilities. *Risk Analysis 11* , 667-675.

Grin, J., & Van de Graaf, H. (1996). Implementation as communicative action. *Policy Sciences, Vol.29* , 291-319.

Hargreaves, D. (1996). *An Investigation into Risk Communication Issues Surrounding A Proposal to Site a 20 MW Straw-Burning Electricity Generating Plant at Calne, Wiltshire in 1994.* Guildford: University of Surrey.

Hasselmann, K., Latif, M., Hooss, G., Azar, C., Edenhofer, O., Jaeger, C., et al. (2003). The Challenge of Long-Term Climate Change. *Science, 302(5652)* , 1923-1925.

Jenkins-Smith, H., & Kunreuther, H. (2001). Mitigation and Benefits Measures as Policy Tools for Siting Potentially Hazardous Facilities: Determinants of Effectiveness and Appropriateness. *Risk Analysis, Vol 21, No. 2* , 371-382.

Jobert, A., Laborgne, P., & Mimler, S. (2007). Local Acceptance of Wind Energy: Factors of Success Identified in French and German Case Studies. *Energy Policy 35* , 2751-2760.

Jäger-Waldau, A., & Ossenbrink, H. (2004). Progress of Electricity from Biomass, Wind and Photovoltaics in the European Union. *Renewable and Sustainable Energy Reviews, 8(2)* , 157-182.

Kahn, R. (2000). Siting Struggles: The Unique Challenge of Permitting Renewable Energy Power Plants. *The Electricity Journal* , 21-33.

Krohn, S., & Damborg, S. (1999). On public attitudes towards wind power. *Renewable Energy 16* , 954-960.

Kunreuther, H., & Easterling, D. (1990). Are risk-benefit tradeoffs possible in siting hazardous facilities? *American Economic Review: Papers and Proceedings, 80* , 252-256.

Kunreuther, H., & Linnerooth, J. (1983). *Risk Analysis and Decision Processes.* New York: Springer-Verlag.

Löfstedt, R. (2002). *Siting of Biomass to Energy Plants: A Review and Analysis of Literature.* London: Draft Background Paper for the Biomass Project Steering Committee Meeting. King's Centre for Risk Management.

Mansfield, C., Van Houtven, G. L., & Huber, J. (2002, August). Compensating for Public Harms: Why Public Goods are Preferred to Money. *Land Economics* , pp. 368-389.

Mendoça, M., Lacey, S., & Hvelplund, F. (2009). Stability, Participation and Transparency in Renewable Energy Policy: Lessons from Denmark and the United States. *Policy and Society 27* , 379-398.

Nadaï, A. (2007). ‘‘Planning’’, ‘‘siting’’ and the local acceptance of wind power:Some lessons from the French case. *Energy Policy 35* , 2715–2726.

Portney, K. (1991). *Siting Hazardous Waste Facilities: The NIMBY Syndrome.* New York: Auburn House.

Rogers, J., Simmons, E., Convery, I., & Weatherall, A. (2008). Public Perceptions of Opportunities for Community-Based Renewable Energy Projects. *Energy Policy* , 4217-4226.

SETIS European Comission. (n.d.). *Strategic Energy Technology Plan Information System*. Retrieved March 04, 2010, from http://setis.ec.europa.eu/mapping-overview/technology-map/technologies/hydropower

Slovic, P., Layman, M., Kraus, N., Flynn, J., & Gessel, G. (1991). Perceived Risk, Stigma an Potential Economic Impacts of High-Level Nuclear Waste Repository in Nevada. *Risk Analysis 11* , 683-696.

Translations, G. D. (2009, January). *Promotion of Renewable Energy Act*. Retrieved April 10, 2010, from http://www.ens.dk/en-US/Info/Legislation/Energy_Supply/Documents/Promotion%20of%20Renewable%20Energy%20Act%20-%20extract.pdf

Upreti, B. R. (2004). Conflict Over Biomass Energy Development in the United Kingdom: Some Observations and Lessons from England and Wales. *Energy Policy 32* , 785-800.

Van Binh, D. (2009). Ten steps to benefit-sharing. *Center for River Basin Organizations and Management (CRBOM), Small Publication Series No. 14* , 1-7.

van den Berg, F., Pedersen, E., Bouma, J., & Bakker, R. (2008). *WINDFARMperception; Visual and acoustic impact of wind turbine farms on residents.* Groningen: FP6-2005-Science-and-Society-20, Specific Support Action, Project no. 044628.

Walker, G. (2008). What are the Barriers and Incentives for Community-Owned Means of Energy Production and Use? *Energy Policy 36* , 4401-4405.

Waren, C., & McFadyen, M. (2010). Does Community Ownership Affect Local Attitudes to Wind Energy? A Case Study from South-West Scotland. *Land Use Policy 27* , 204-213.

Wien Energie. (2009). *Spittelau*. Retrieved March 05, 2010, from Wien Energie: http://www.wienenergie.at/we/ep/channelView.do/channelId/-28277/pageTypeId/19118

Wüstenhagen, R., Wolsink, M., & Bürer, M. J. (2007). Social Acceptance of Renewable Energy Innovation: An Introduction to the Concept. *Energy Policy 35* , 2683-2691.